Research Division Annual Work Program State Fiscal Year 2006

Prepared For:

Utah Department of Transportation Research and Development Division

Authored By:

Michelle A. Page, Program Manager Ken Berg, Development Engineer

June 2005

UDOT RESEARCH & DEVELOPMENT REPORT ABSTRACT

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DISCLAIMER

The contents of this report reflect the view of the authors, who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Utah Department of Transportation (UDOT).

Report No. UT-05.08

Utah Department of Transportation

Research Division Annual Work Program State Fiscal Year 2006*

(July 1, 2005 to June 30, 2006)

Annual Status Report

TOOLS



FOR



BETTER TRANSPORTATION TOMORROW



Introduction

The purpose of this publication is to provide a progress report and a working plan for the management of the research, development and implementation activities of the Utah Department of Transportation (UDOT) for the 2006 state fiscal year. All funding sources with their associated work plans are included. A companion document entitled, *Manual for Management of UDOT's Research, Development and Technology Transfer Program*, dated December 1995, will aid in characterizing UDOT's research program. It also provides the management framework required under Chapter 23 of the Code of Federal Regulations (CFR), Part 420, Subpart B, for the State's administration of State Planning and Research (SPR) funds. This plan was approved by FHWA on January 10, 1996.

Historical Factors that Helped to Shape the Current Research Division Program

Research was one of the principal missions of the first national highway program in the United States and is the oldest continuous federal highway activity. The Federal Highway Act of 1921 authorized the first sustained fiscal support for highway research. Support for highway research was reaffirmed in the Federal-Aid Highway Act of 1962, which mandated funds for planning and research purposes only. Most recently, the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 required that a minimum of 25% of the State Planning and Research (SPR) funds be expended on research, development and technology transfer activities.

During the late 1980's, the Department underwent significant downsizing, resulting in the loss of experienced personnel and trained research professionals. As a response, a greater percentage of research was performed by outside sources. It was felt that outside sources would bring greater expertise and efficiency for many subject areas. This continues to be the practice. A large percentage of the research projects are currently performed by either universities or consultants in the private sector. For these projects, the Research Division performs project management functions. It has been found, however, that some topics could not be efficiently or effectively addressed by outside sources because of their lack of institutional knowledge related to areas of specific transportation expertise. Therefore, a small percentage of research, as well as most development and technology transfer activities, continue to be performed in-house.

UDOT's research, development and technology transfer functions were separated from Materials and set up as a separate division in 1993. About this time, the process of facilitating an annual workshop in which UDOT stakeholders can brainstorm and prioritize research topics was resumed. The group of UDOT stakeholders is known as the Utah Transportation Research Advisory Council (UTRAC) and the annual workshop has come to be known as the UTRAC Workshop. The result has been an increasingly diverse mix of research projects funded. In recent years, nearly all the functional areas of the Department have benefited by the activities of the Research Division.

Another historical factor, an outgrowth of ISTEA legislation, has helped to shape the current UDOT research program. ISTEA supported expansion of the University Transportation Centers program. These centers were to be funded by the US DOT through the FHWA on a regional basis and would be required to develop unique objectives having regional significance.

The FHWA's Region 8 center, known as the Mountain Plains Consortium (MPC), has established rural transportation and distance learning as its themes. The Utah Transportation Center at the University of Utah is affiliated with MPC.

UDOT Strategic Direction

The Research Division makes every effort to align it's program with the department's Strategic Direction. The following elements describe UDOT's Strategic Direction.

Mission Statement

Quality Transportation Today, Better Transportation Tomorrow. We connect communities.

Values

Employee Centered Customer Focus Quality Service Great Performance

Strategic Goals

Take Care of What We Have

Focus Areas:

Pavement Preservation Bridge Preservation Maintenance Efforts

Make the System Work Better

Focus Areas:

Traffic Management Traveler Information Access Management

Improve Safety

Focus Areas:

Roadway Safety Work Zone Safety Pedestrian/Bicycle Safety

Increase Capacity

Focus Area:

Add Lanes

Program Development

The aforementioned strategic goals and focus areas can best be achieved by involving our customers in the process of developing the program and generating the products. This assures that their needs and satisfaction are considered at all times. This is achieved though the UTRAC needs identification process as well as through participation by UDOT technical personnel on Technical Advisory Committees (TAC's) that are empowered to help guide each major study undertaken. Because of the number of currently active projects, UTRAC was not held in FY 04 in order to allow the Research staff to concentrate on completing and implementing active projects.

Project Development Objectives:

Excellent Customer Service
Technical Expertise
Effective Training
Continuous Self Improvement
Policies, Procedures, Standards & Specifications
Leadership for Innovative Practices
Building Tomorrow's Systems Today

Research Division Mission Statement

The Research Division is responsible for planning, conducting, coordinating and managing transportation related research and development, and promoting the implementation of beneficial results. The customers of the programs, projects and products generated by the Research Division are the other operating divisions and regions within UDOT as well as other transportation agencies and, of course, end users of the transportation network. The fundamental objectives of the Research Division are reflected in the following mission statement:

Tools for Better Transportation Tomorrow

National Program Services

Literature Searches

The Research Division continues to perform literature searches. The TRIS database is now accessible directly via the internet.

NCHRP and TRB

Since 1969, the National Cooperative Highway Research Program (NCHRP) has played an important part to all state transportation research programs. The Transportation Research Board, (TRB) a division of the National Science Foundation, administers it on behalf of the American Association of State Highway and Transportation Officials (AASHTO), and the Federal Highway Administration (FHWA). Funding contributions are apportioned among the various states as well as the FHWA. The source of contribution can be 100% federal dollars. No state match is required.

The NCHRP program provides four major research functions. These functions include: 1) identification and execution of large studies having national scope and implementation potential; 2) periodic, regular synthesis of topics having national significance; 3) small scale studies requiring immediate response that are identified by individual AASHTO committees through an informal process; and 4) the more recent IDEA/ITS program that focuses on helping promising transportation related technology achieve an implementation status.

The NCHRP has established a history of fostering research activities through a well thought out and balanced process, one that is designed to provide the discipline required to achieve focused, applied, implementable, transportation research while still maintaining the freedom to look outside-the-box to get fresh perspectives and ideas. It is a process that grew up through the same culture and shares many commonalities with that of the Utah Transportation Research Advisory Council (UTRAC). Both solicit participation and ideas from a broad and diverse spectrum of interests and expertise. However, final funding decisions are made by a representative group of transportation oriented technical and managerial experts. Also, individual studies are guided by Technical Advisory Committees (TAC's), at least half of which are made up of transportation stakeholders; but, diverse interest groups are also encouraged to participate.

From a program perspective, it is important to recognize that NCHRP topics are chosen to address scopes of national interest. The value of this major investment is that it agglomerates resources for solving problems at a funding level that would not be possible for most individual states acting alone. However, it is not designed to respond to topics limited to regional or local interest. As a result, it constitutes only a portion of a well-balanced research program. The current Executive Director and Deputy Director of UDOT both recognize the value of leveraging UDOT's contribution to this pooled fund approach.

The Transportation Research Board (TRB) activities focus on topics of national interest. However, its method of operation is different than that of NCHRP. It supports technology transfer through the

volunteer activities of technical committees made up of nationally and internationally recognized experts. These experts bring forth research findings, supported primarily by funding sources external to TRB. These findings are peer reviewed and evaluated by the committee membership. Successful submittals are then presented at formal sessions during an annual meeting and are also published. In addition, the technical committees identify research needs for consideration by other funding agencies.

Some of the results presented are in the realm of basic research relative to transportation issues. Others are focused on applied topics and are immediately implementable. The Transportation Research Board is internationally recognized as the premier forum of transportation related technology transfer.

The funds contributed to TRB are used to sponsor the annual forum that supports this technology transfer. Also, they pay for publication of the peer reviewed technical reports submitted.

The Utah Department of Transportation utilizes the TRB investment in a number of ways. Currently, attendance at the annual meeting is being supported on a rotating basis among various disciplines and divisions within the Department, as well as those that prepare papers and poster presentations. This is advantageous in that, over a long period of time, it exposes the greatest number of people to the technology and process.

NTPEP

UDOT is an active member of the AASHTO National Transportation Product Evaluation Panel (NTPEP). The Research Division represents UDOT as a voting member of the panel. The Department provides labor costs and annual fees for supporting the program. Participation with this national program has the potential to save a significant amount of testing and evaluation costs at the Department level.

Research Division Staff

Research Division's staff information is shown in Table A.

Table A Research Division Staff

Name	Title	Phone
Shana Lindsey, P.E.	Director of Research	801-965-4196
Doug Anderson, P.E.	Research Project Manager	801-965-4377
Ken Berg, P.E.	Development Engineer	801-965-4321
Dan Hsiao, P.E.	Research Project Manager	801-965-4638
Blaine Leonard, P.E.	Research Project Manager	801-965-4155
Barry Sharp	Research Specialist II	801-965-4314
Michelle Page, P.E.	Research Program Manager	801-965-4333
Abdul Wakil, P.E.	Technology Transfer Engineer	801-964-4455
Esther Olsen	Secretary	801-964-4568
Debbie Heim	Research Technician	801-965-4017
Melodie O'Carroll	Librarian	801-965-4626
Rae Ann Jensen	Archive Specialist	801-965-4656

Research Division Functional Units

The Research Division program is divided into three functional units: research; development, and technology transfer. Research activities attempt to identify the potential of scientific discoveries or improvements in technology, materials and processes to advance the state of the art. UDOT research activities focus primarily on applied rather than basic topics. This means that the results of the research are immediately implementable and would result in improvements to safety or efficiency.

Development includes the evaluation and enhancement of new and existing products and processes and the review of standards, policies and procedures relative to these products and processes. Technology transfer activities include the application and dissemination of the results of research and development, both that sponsored by UDOT as well as other sources. A more detailed description of each of these functional units is described below.

Research Activities

Research activities cover a broad range of objectives dealing with numerous topics, methodologies and degrees of involvement. The over-riding goal is to identify the needs of our internal and external customers, to partner with those customers, and to develop a balanced program that meets their needs.

Historically, research objectives have included measurement of material properties and their longevity, verification of design practices, evaluation of current procedures, application of new technologies and consideration of economic benefits. Topics have included foundations, structures, pavements, roadway geometry, traffic, safety, planning, maintenance, environmental, public transportation and public relations. Methodologies that include literature searches, surveys, synthesis, analysis, physical testing, physical and analytical modeling are all employed where appropriate. Degree of involvement ranges from informal responses to management of large, complex studies.

The Research Unit maintains active contact with the three major engineering colleges in the state and cooperates with other universities and colleges where their research is beneficial to the Department. The Research Unit also interacts with other state highway agencies, the Federal Highway Administration (FHWA), the Transportation Research Board (TRB) and numerous other technical organizations in the identification and performance of research objectives.

New research projects are identified and prioritized by the Utah Transportation Research Advisory Council (UTRAC), primarily through its annual workshop. Projects identified as having the highest priority and potential benefits, within the limitations of funding, are included in the annual Work Program. Projects having national or regional scope are recommended to the NCHRP for funding or are included with other pooled-fund activities. Searches of both published and unpublished literature sources are performed early in the process to avoid duplication and to utilize the work of others wherever feasible.

Once research projects have been identified for funding, Technical Advisory Committees (TAC's) are organized to help refine the work plan and to review the progress and results produced by the study. These committees are made up of potential end users of the technology. They meet at least on a quarterly basis and typically more often during the beginning stages of a project. The Research Unit provides project management functions to monitor progress of the study and coordinate the activities of the principal investigator and the TAC. Some of the more successful recent studies have been performed using a team approach, with both the principal investigator and UDOT personnel contributing to the outcome of the work.

Development Activities

The Research Division has primary responsibility for managing and conducting the new product evaluation process for UDOT. Three staff members, Michelle Page, Ken Berg and Barry Sharp, spend a significant amount of their time managing this process. Vendor requests are submitted on a standardized form, and are reviewed monthly by the New Product Evaluation Panel (NPEP). The Division, documenting the activity in this area, maintains an Accepted Products Listing (APL) and a comprehensive database. Some non-labor funds are also allocated to this activity, which allows for the purchase of products and outside technical services used for evaluation and testing.

Development functions are directed both to the New Products and Experimental Features Programs. These programs serve as a clearinghouse for the evaluation and field testing of new products. In a typical year, UDOT receives 100 or more requests from private vendors to use their products. The Development Unit provides a consistent, unbiased, methodical approach to prioritizing the evaluation and approval of new products.

Development projects are carried out in cooperation with the other divisions within UDOT. During the past year, the New Products Evaluation Panel (NPEP) has been very active. This panel is composed of individuals from the various functional units within UDOT that are concerned with new product evaluation. The panel meets monthly to screen and prioritize review of products based on needs, funding limitations and potential benefits. The activities of this panel are summarized annually in report format.

The 'Accepted' Products Listing (APL) and the 'Performance Data' Products Listing (PDPL) are published as a result of decisions made by NPEP.

Selected products are occasionally evaluated on small-scale test sections called *Experimental Features*. These items are placed in the field for demonstration purposes. The test sections typically address concerns such as installation, handling, construction and durability prior to general approval of a product. The results of these findings are published annually in interim and/or final reports. The list of current active Experimental Features are shown in the following table.

Abdul Wakil of the Research Division has the primary responsibility for technology transfer initiatives. Results are promoted through publication, development of new standards, approved product listings, specifications, procedures, workshops, literature searches, video conferencing and other means. Newsletters are published periodically to help keep UDOT employees and other research associates across the country updated on research activities. Another key element of the technology transfer program is the review and dissemination of information that is obtained from other research agencies via hard copy publications and electronically.

Workshops and/or training sessions are facilitated and sponsored by the Research Division when needed to implement study findings or promote new technology.

Funding

As of Aug. 19, 2002, 23 CFR was revised to stipulate that the costs to administer the State Planning & Research work program cannot be directly charged, but, can, however, be allocated to research projects and recovered as part of the cost of each project. These administration costs for the coming fiscal year are estimated, prorated and included in each research project budget.

The following four tables represent the projected FY06 budget with some carryover represented in FY07 and FY08. Table 1 is an all-inclusive summary of commitments to date with references to Tables 2-6.

Table 1: RESEARCH SPR Funds For FYO6 Work Program

		g				
SPR Funds Available obligated \$861,386 Future unobligated (est.) \$1,457,307 Use unobligated to cover SPR 02 overages due to cost allocation \$11,276		Note: LTAP Fu required federa		rior to establishment of	f the Research Bud	get since it is a
TOTAL SPR AVAILABLE \$2,307,417 1						
FY06 SPR PROGRAM COSTS TIG \$5,000 TRB \$75,000 NTPEP \$6,000 NCHRP \$159,600 FHWA Peer Exchange \$5,000 TOTAL PROGRAM COSTS \$250,600 2						
POOLED FUND LEAD STATE COSTS Pavement Marking Life Cycle WASHTO X	Budget	Previous FY's	FY06	FY07	FY08	Project Manger Ken Berg Doug Anderson
Dynamic Passive Pressure on Abutments and Pile Caps TOTAL POOLED LEAD STATE COSTS	\$75,000 \$75,000		\$40,000 \$40,000 3	\$35,000 \$35,000		Daniel Hsiao
POOLED FUND NON LEAD STATE COSTS TCCC Training Management & Development Western Alliance for Quality Transportation Construction Evaluation of the Safety Edge Traffic Management Center	Budget \$60,000 \$40,000 \$45,000 \$100,000	Previous FY's \$20,000 \$20,000 \$15,000 \$25,000	FY06 \$20,000 \$10,000 \$15,000 \$25,000	FY07 \$20,000 \$10,000 \$15,000 \$25,000	FY08 \$25,000	Lead Agency FHWA Alaska FHWA FHWA
Aurora Program Western Transportation Institute—Evaluation of Road Weather Information System Program at UDOT	Ongoing \$20,000	\$25,000	\$25,000 \$25,000 \$20,000	\$25,000	\$25,000	FHWA Utah
(Subset of Aurora program with UDOT as lead state) Demonstration and Evaluation of ITS Technology for				040.000		
The rural Highway Environment a.k.a. "FRONTIER" Evaluation of Low Cost Safety Improvements TOTAL POOLED FUND NON LEAD STATE	\$20,000 \$150,000	\$105,000	\$10,000 \$150,000 \$275,000 4	\$10,000 \$105,000	\$50,000	Montana FHWA
CURRENT SPR PROJECT COSTS (See attached) TOTAL TO COMPLETE CURRENT SPR PROJECTS Research PM's	Budge \$1,519		FY9 \$74	06 FY07 49,678 5 \$575		8 4,000
NEW UTRAC PROJECT COSTS (See attached) TOTAL TO COMPLETE NEW UTRAC PROJECTS	Budget \$1,366	Previous FY's ,518	FY06 \$769,477	FY07 6 \$247,000	FY08 \$65,000	
SPR FY06 SUMMARY	\$250 \$40 \$275 \$749 \$769 \$450 \$450	,417 SPR Available ,600 FY06 SPR Program Cos ,000 FY06 Lead Pooled Fund ,000 FY06 Non-Pooled Fund ,678 FY06 Current SPR Proje ,477 Est. FY06 UTRAC Comn ,000 Anticipated Carryover S ,000 75% of Personal Service ,242 Misc. Personal Service ,335 Travel Annual Budget	Costs 3 Costs 4 ects 5 nit. 6 PR es (Overhead)			

\$56,085 Remaining After Total Expenditure/Commitments for FY06 (Contingency for Additional Pool Fund Requests, Special Studies, Contract Mods, Travel, Etc.)

Table 2: RESEARCH STATE FUNDS For FY06 Work Program

STATE FUNDS	AMOUNT
FY06 State Funds (est.) FY06 UTRAC Funds Committed Est. to Complete Current State Project Costs (See Attached) 25% of Personal Services (Overhead)	\$492,700 \$72,000 \$176,752 <u>\$150,000</u>
TOTAL STATE AVAILABLE FOR FY06	\$93,948

Table 3: CURRENT SPR PROJECT COSTS

DESCRIPTION	ORIGINAL ESTIMATE	CURRENT ESTIMATE TO COMPLETE	PREVIOUS FY's	FY 06	FY 07	FY 08
DOWN-DRAG OF PILES	\$30,000	\$59,000		\$45,000	\$14,000	
BRIDGE SCOUR COUNTERMEASURES Phase II	\$45,000	\$45,000		\$12,000	\$29,000	\$4,000
BRIDGE DECK STRATEGY	\$45,000	\$45,000	\$26,000	\$19,000		
DEVELOP UTAH WETLANDS ASSESSMENT METHOD	\$55,000	\$44,500	\$18,143	\$26,357		
LONG TERM MONITORING OF I-15 EMBANKMENT	\$150,000	\$225,000		\$70,000	\$70,000	\$85,000
PREVENTABLE DECK JOINT & SURFACE TREATMENTS STRATEGY	\$80,000	\$132,815	\$5,000	\$105,000	\$22,815	
EVAL. TRAFFIC & SAFETY INITIATIVES (CONTRACT EXTENSION)	\$90,000	\$49,425	\$49,425	\$49,425		
PRIORITIZATION OF IMPORTANT ROUTES (CRITICAL LIFELINES)	\$90,000	\$90,000			65,000	\$25,000
IMPLEMENTATION OF AASHTO DESIGN GUIDE	\$155,000	\$79,180		\$39,590	\$39,590	
WEB-DELIVERED PAVEMENT & TRAFFIC DATA	\$43,000	\$14,556	\$28,444	\$14,556		
N/D EVAL. METHOD FOR STRESS IN GIRDERS	\$175,000	\$180,000		\$50,000	\$100,000	\$30,000
HEALTH MONITORING OF I-15 STUCTURES	\$140,000	\$210,000		\$70,000	\$90,000	\$50,000
MATERIALS CHARACTERIZATION FOR THE AASHTO 2002 PAVE DESIGN GUIDE	\$150,000	\$150,000		\$75,000	\$75,000	
UTAH LTPP MONITORING	\$50,000	\$50,000		\$35,000	\$15,000	
IMPACTS OF RAISED MEDIANS	\$70,000	\$20,000	\$50,000	\$20,000		
MONITORING SPLICED GIRDERS, DECK PANEL, JOINTS & FRP RETROFIT	\$30,000	\$25,000	\$5,000		\$25,000	
MONITOR MSE WALLS, PHASE 2	\$80,000	\$60,000	\$20,000	\$30,000	\$30,000	
LOAD RATE ON AXIAL AND LATERAL PILE CAP	\$150,000	\$70,000	\$80,000	\$70,000		
ROCKFALL HAZARD RATING SYSTEM	\$40,000	\$18,750	\$21,250	\$18,750		
TOTALS	\$1,668,000	\$1,568,226	\$303,262	\$749,678	\$575,405	\$194,000

Table 4: NEW UTRAC PROJECT COSTS (2005 UTRAC PROBLEM STATEMENT SUMMARY LIST – PRIORITIZED FOR FUNDING)

FUNDING PRIORITY	PROB NO.	PROBLEM TITLE	SUBMITTED BY	CHAMPION	PROJECT MNGR	SCHEDULE	APPROX BUDGET	YEAR 1 BUDGET	YEAR 2 BUDGET	YEAR 3 BUDGET	FUNDING SOURCE	STATE FUNDING	FED. FUNDING
1	05.01- 1	Mitigate Queue Lengths in Work Zone Traffic Control	Darrell Giannonatti and Doug Anderson	Pete Negus	Blaine L	Oct 05 due	\$50,000	\$50,000			SPR		\$85,250
2	05.02- 02	Cost-effectiveness & Indicators-pavement Rejuvenation	Scott Nussbaum	Scott Nussbaum	Barry Sharp	3 Year Study	\$80,000	\$30,000	\$30,000	\$20,000	SPR		\$51,150
3	05.03- 4	Full-Depth Recycling and Stabilization of Pavement Base Layers	Spencer Gutherie and Nathan Lee	Nathan Lee	Doug A.	2 Year	\$100,000	\$50,000	\$50,000		SPR		\$85,250
4	05.04- 6	Design Methods for Unique Culvert Installations	William Grenney	Denis Stuhff	Michelle P.		\$35,000	\$35,000			SPR		\$59,675
5	05.05- 7	Extract Vehicle Classification from TOC Video	Chris Glazier	Chris Glazier and Richard Manser	Doug A.		\$73,077	\$73,077			SPR		\$124,596
6	05.06- 6	Advanced Warning Signal Site Selection Evaluation Matrix	Mack Christensen and Grant Shultz	Mack Christensen	Shana L.	9-12 Months	\$35,000	\$35,000			SPR		\$59,675
7	05.07- 3	Dynamic Passive Pressure on Abutments & Pile Caps	Kyle Rollins and Gerber (BYU)	Biscoff/Boyle /Sjoblom	Dan. H	2 Years	\$75,000	\$40,000	\$35,000		SPR/Poole d		\$68,200
8	05.08- 1	Improvement of Deck Concrete Mix Design and Curing Practices	Barr, Halling and Ryan USU	Todd Jensen	Dan H	2-3 Years	\$70,000	\$35,000	\$30,000	\$5,000	SPR		\$59,675
9	05.01- 3	Worker Visibility	Darrell Giannonatti and Doug Anderson	Darrell Giannonatti	Michelle P.	Oct. 5 due	\$25,000	\$25,000			State	\$42,625	
10	05.02- 06	Skid Index Trigger Values	Lloyd Neeley	Bill Lawrence	Barry S.		\$10,000	\$10,000			SPR		\$17,050
11	05.03- 1	Asphalt Binder Uniformity	Cameron Petersen	Kevin Van Frank	Doug A.		\$100,000	\$100,000			SPR/Poole d		\$170,500
12	05.04- 2	Bridge Scour Countermeasure Phase II	Michael Fazio	Michael Fazio, Denis Stuhff, Tim Ularich	Dan H.	2 Year	\$42,000	\$30,000	\$12,000		SPR		\$51,150
13	05.05- 3	Access Management Performance Index	Tim Boschert, Grant Shultz (BYU)	Tim Boschert	Michelle P.		\$35,000	\$35,000			SPR		\$59,675
14	05.06- 7	Access Management/Traffic Impact Analysis Training	Tim Boschert, Grant Schultz	Tim Boschert	Shana L.	12 Months	\$30,000	\$30,000			SPR		\$51,150

15	05.07- 2	Programming of Strong Ground Motion Instrumentation of New Bridges	Marv Halling (USU)	Jim Higbee	Blaine L	1 Year	\$30,000	\$30,000			SPR		\$51,150
16	AM.05 .001	Evaluation of Effects of Stay in Place Forms on Bridges	Wadsworth Constructio n	Todd Jensen	Dan H.	1 Year	\$50,000	\$50,000			SPR		\$85,250
17	05.04- 1	Design & Development of a Context Sensitive Visual Resource Assessment and Management (VRAM) System for UDOT	Terry Johnson	Terry Johnson and Lars Anderson	Michelle P.	2 Years	\$88,000	\$44,000	\$44,000		SPR		\$75,020
18	05.02- 07	Targeted and Adaptive Simulator Training for Winter Maintenance	David Strayer	Richard Clarke and Shana Lindsey	Shana L	6 Months	\$9,900	\$9,900			SPR		\$16,880
19	05.05- 11	Determination of Crash Costs for Use in Benefit/Cost Analysis (Value of Life)	Jim McMinnime e & Doug Anderson	Jim McMinnimee	Doug A.		\$25,000	\$25,000			SPR		\$42,625
20	AM.05 .002	Evaluation of Rapid Mapper Technology		Lisa Wilson	Angelo P.		\$42,000	\$42,000			State	\$71,610	
21	AM.05 .003	Older Driver Study: Evaluation of Safety Effects of pavement Markings and Signage			Shana L	2 Years	\$80,000		\$40,000	\$40,000	SPR		
22	AM.05 .004	Pavement Marking Study (Test Sections)		Shana L.	Shana L. and Michelle P.	8 Months	\$5,000	\$5,000			State	\$8,525	
23	05.05- 10	Good Roads Cost Less	Gary Kuhl	Kim Schvaneveldt	Abdul W.	6 Months	\$20,000	\$20,000			SPR		\$34,100
24	05.03- 3	SMA Paving Mechanistic Properties	Rodney Terry	Rodney Terry	Doug A.	2 Years	\$100,000	\$50,000	\$50,000		SPR		\$85,250
25	05.07- 6	Geophysical methods to prioritize mitigation options for SR-9 in the Coal Hill landslide area.	Francis Ashland UGS	Leslie Heppler	Blaine L.		19,500	\$19,500			SPR		\$33,248

Note: Highlighted studies will be postponed unless additional money becomes available.

Table 5: CURRENT STATE PROJECT COSTS

DESCRIPTION	BUDGET	ESTIMATE TO COMPLETE	PREVIOUS FY's	FY 06	FY 07	FY 08
EVALUATE WORK ZONE TRAVELER INFO.SYS.	\$80,000	\$61,400		\$50,000	\$11,400	
DYNAMIC CHARACTERISTICS OF NEW BRIDGES	\$109, 000	\$53,850	\$15,000	\$38,850		
STRONG MOTION INSTRUMENTATION OF BRIDGE SITE	\$80,000	\$17,750		\$5,902	\$5,902	\$5,902
ADAPTIVE SIGNAL CONTROL IMP & EVAL	\$40,000	\$60,000		\$60,000		
EFFECTIVENESS OF HOV LANES, PH 3	\$29,000	\$43,500	\$38,500	\$5,000		
UTAH INTERSECTION SAFETY	\$45,000	\$67,500	\$62,500	\$5,000		
SMART PDA	\$12,000	\$12,000		\$12,000		
TOTALS	\$440,000	\$383,455	\$116,000	\$176,752	\$17,302	\$5,902

Table 6: I-15 Test Bed Funds

Phase 1:	Programmed Amount:		
1	TEA-21 (incl. 20% State Match)	\$250,000	
	Total Phase 1 program		\$250,000
	Costs to Date	(\$182,930)	
	Balance	\$67,0700	
	Estimate to Complete	\$0	
Di 0	Estimated remaining Ph	ase 1 program	\$67,070
Phase 2:	Programmed Amount: TEA-21 (incl. 20% State Match)	\$1,500,000	
	Total Phase 2 program	* 1,222,000	\$1,500,000*
	Costs to Date	(\$1,454,357)	
	Balance	\$45,643	
	Estimate to Complete	\$71,478	(40 - 00 -) \
	Estimated remaining Ph		(\$25,835)**
	* - Other state, private, and pooled-fund funding so have been expended.	_	programmed and
Phase 3:	** - Will be covered with Phase 1 remaining programmed Amount:	ammed amount	
1 11000 01		\$937,500	
	TEA-21 (incl. 20% State Match)		
	FY 03 SPR	\$280,000	
	FY 05 SPR	\$563,600	
	Total Phase 3 program		\$1,781,100
	Costs to Date	(\$1,250,600)	
	Balance	\$531,100	
	Estimate to Complete	\$531,100	
	Estimated remaining Ph	ase 3 program	\$0
Phase 4:	Programmed Amount:		
	TEA-21 (incl. 20% State Match)	\$1,000,000	
	FY 05 State	\$300,700	
	FY 05 SPR	\$222,100	
	Total Phase 4 program	\$	\$1,522,800
	Costs to Date	(\$546,492)	
	Balance	\$976,308	
	Estimate to Complete	\$976,308	
	Estimated rema	ining program	\$0

Table 7 shows the current Innovative Bridge Projects, each of which are separate federal grants. Details of the active Innovative Bridge projects are shown in the Project Status Sheets.

Table 7: Innovative Bridge Funds

Description	Prog. Amt.	Costs To Date	Balance	Est. to Complete ¹
Stainless Clad Rebar Rt. 79 MP 2, Weber Co.	\$68,500	\$44,500	\$24,000	\$24,000
I-80, Co. Rd. Over I-80, 1.9 Miles E. of Wanship, Precast Deck	\$175,615	\$130,866	\$44,749	\$44,749
R-2, I-215 Over 3760 S. & 3900 S.	\$55,000	\$29,411	\$25,589	\$25,589

^{1 -} Includes state match and 26% allocation of administrative costs.

Completed Projects
Table 8 shows projects completed within the FY05.

Table 8: Completed Projects

lable 8:	Complet	ed Projects
Fund Source	CHARGE ID	DESCRIPTION
SPR	81FR0032	DEEP DYNAMIC COMPACTION STUDY
SPR	81FR0033	UPDATE "GOOD ROADS COST LESS"
SPR	81FR0140	IMPLEMENTATION OF SMART PDA
SPR	81FR0141	SURFACE RESPONSE SPECTRA (PEER REVIEW OF GENERAL PROCESS)
SPR	81FR0141	SURFACE RESPONSE SPECTRA GENERAL PROCESS
SPR	81FR0141	SURFACE RESPONSE SPECTRA (LIQUEFACTION)
SPR	81FR0143	LOWER SPEED WORK/NON WORK ZONES
SPR	81FR0211	DOWNHOLE ARRAY AT 1-15/2100 S.
SPR	81FR0220	VIDEO BASED TRAFFIC CLASSIFICATIONS PH. 2
SPR	81FR0276	EVALUATION OF I-15 DESIGN/BUILD PROJECT
SPR	81FR0276	REVIEW EVALUATION OF I-15 DESIGN/BUILD PROJECT
SPR	81FR0333	ASSESS USER IMPACTS OF FAST TRACK CONSTRUCTION
SPR	81FR0345	PERFORMANCE BIDDING FOR ASPHALT PAVEMENTS
SPR	81FR0131	ALTERNATIVE AVALANCHE CONTROL AMMUNITION
SPR	81FR0292	LONG TERM MONITORING OF I-15 EMBANKMENT PERFORMANCE-GEOFOAM
STATE	81SR0011	CRASH DATA AVAILABILITY
STATE	81SR0123	EVAL. SAMPLE DISTURBANCE FROM SHELBY TUBE VS. PISTON SAMPLERS & MSE EVAL.
STATE	81SR0211	ADAPTIVE SIGNAL CONTROL PH 2
STATE	81SR0212	AUTO MEASURES OF EFFECTIVENESS OF ATMS
STATE	81SR0213	EFFECTIVENESS OF HOV LANES PH 1
STATE	81SR0222	AIR QUALITY HOT SPOTS
STATE	81SR0223	IMPROVE ACCURACY OF DESIGN DISCHARGE CALCULATIONS
STATE	81SR0272	DEVELOPMENT OF PROTOTYPE CULVERT DATABASE FOR CULVERT COND. STUDY
STATE	81SR0291	BMP ROCKFALLS PH 1 (PRELIM. RATING)
STATE	81SR0291	BMP ROCKFALLS PH 2, PART 1 (DETAILED RATING)
STATE	81SR0293	REPAIR OVERHEAD ALUMINUM SIGN
STATE		EXPECTED ACCIDENT RANGE OF HIGHWAY FUNCTIONAL CLASS
STATE	81SR0354	AUTO. DATA COLLECTION ANALYSIS
STATE	81SR0355	DETECTOR TECHNOLOGY EVALUATION
STATE	81SR0356	EVAL. EFFECT DILEMMA ZONE OF ADVANCED SIGNAL WARNING
STATE	81SR0361	NOISE REDUCTION ON I-215 FOLLOW-UP
STATE	81SR0363	EQ DRAIN CANLEX TEST
TB2T	81F15023	LATERAL LOADS ON PILE GROUPS PH 3
TB3	81F15306	LONG TERM EVALUATION OF FRP FOR BRIDGE RETROFIT
TB4	81F15402	DOWNHOLE ARRAY AT I-15/2100 S.
TB4	81F15408	ASSESS USER IMPACT OF FAST TRACK CONSTRUCTION
TB4	81F15409	I-15 TECHNOLOGOY TRANSFER WORKSHOP
PFLS	4001808H	PAVEMENT MARKING LIFE CYCLE PH 1
PFLS	4002708H	LATERAL LOADS ON PILE GROUPS
SPR	81FR0218	UTAH CORRIDOR PRESERVATION STUDY
SPR		CONDITION OF EXISTING HIGHWAY CULVERTS AND DETERMINATION OF PERFORMANCE MEASURES

SPR	81FR0237	LOCATION OF RWIS ENVIRONMENTAL STATIONS
SPR	81FR0344	SIMULATOR TRAINING FOR WINTER MAINTENANCE
TB2	81F15022	EVALUATION OF GEOPIER FOUNDATIONS SYSTEMS, PH. 2
TB3	81F15307	ULTIMATE AND RESIDUAL CAPACITY OF GEOPIER FOUNDATIONS SUBJECTED TO UPLIFT AND COMPRESSION LOADS (GEOPIER FOUNDATIONS, PH. 3)
SPR	81FR0292	LONG TERM MONITORING OF I-15 EMBANKMENT PERFORMANCE, PH. 1
TB2	81F15022	EVALUATION OF GEOPIER FOUNDATION SYSTEMS, PH. 2
TB3	81F15307	ULTIMATE AND RESIDUAL CAPACITY OF GEOPIER FOUNDATIONS SUBJECTED TO UPLIFT AND COMPRESSION LOADS (GEOPIER FOUNDATIONS, PH. 3)
SPR	81FR0344	SIMULATOR TRAINING FOR WINTER MAINTENANCE
TB3	81F15302	EXPERIMENTAL DETERMINATION OF DYNAMIC CHARACTERISTICS OF NEW BRIDGES (FORCED VIBRATION, PH. 3)
TB3	81F15303	LONG TERM STRUCTURAL MONITORING OF POST-TENSIONED SPLICED GIRDERS AND DECK JOINTS
TB4	81F15406	EVALUATION OF FIBER REINFORCED POLYMER COMPOSITE CONFINED RECTANGULAR CONCRETE COLUMNS
SPR	81FR0142	SCOUR COUNTERMEASURE STUDY, PH. 1
SPR	81FR0210	BRIDGE DECK STRATEGY
STATE	81SR0350	HYDRAULIC DISCHARGE CALCULATIONS, PH. 2 (FREQUENCY)
STATE	81SR0441	HYDRAULIC DISCHARGE RECALCULATIONS, PH. 2 (CANYONS)
SPR	81FR0333	FAST TRACK CONTRACTING
STATE	81SR0341	CRASH DATA DELIVERY USING GIS, PH. 2
STATE	81SR0359	SMART PDA-SOFTWARE DEVELOPMENT

Key:
STATE State
SPR State Planning & Research
PFLS Pooled Fund Lead State
IB Innovative Bridge
TB_ I-15 Test Bed, Phase ____

Note: The following sections contain Project Status Sheets on all active projects.

SPR FUNDED STUDIES



Title		Evaluate Traffic and Safety I	nitiatives	
Fund. Source	SPR	Project Type	Traffic & Safety	
Charge ID	81FR0341	Performing Org.	BYU	
PIC	UT02.401	Contract No.	03-9153	
Project Mgr.	Lindsey	Contract Start Date	2/15/2003	
Princ. Inv.	Saito	Contract End Date	2/15/2005	
		FISCAL PLANTS OF THE STATE OF T	A PROPERTY OF	
Contract Amt.	\$83,000	Contract Cost to Complete	\$32,950	
Contract Cost to Date	\$50,050	Project Cost to Complete	\$42,835	

IMPLEMENTATION PLAN

On schedule

	TASK PROG			20	003			20	04			200)5	I		200	6
NO.	TASK		Q1	02	03	Q4	Q1	Q2	C)3	Q4	<u>a1</u>	G2	Q3	04	91	<u>02</u>	<u>03</u>
1	Review TAC Rec	Est			ļ					ļ	_					_	_
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2	Goel of STUDY Long term	E*L		ļ	ļ				ļ	ļ	<u> </u>					_	
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3	Litterature review	Est	_		_				<u> </u>	ļ	<u> </u>						
***************************************		Act.	<u> </u>		<u></u>	ļ			<u></u>		L						
4	Public survey on Udot's ATIS	Est.			_	_				_		<u></u>					
4		Act							L		L						,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
5	Improvement recomendation	Est.									1						
		Act.									_						
6	Forcesting methods	Est.									_			<u> </u>	L		Ĺ
0		Act.															
7	Functionality and system interfaces	Est												_			
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<u> </u>	Real time Treffic reassignment	Est															
8		Act	_														
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9		Act															
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und, Source	COD		
	SPR	Project Type	Traffic & Safety
Charge ID	81FR0515	Performing Org.	BYU
PIC	AM05.001	Contract No.	05-9046
Project Mgr.	Lindsey	Contract Start Date	7/1/2004
Princ. Inv.	Schultz	Contract End Date	7/1/2006
		FISCAL	
Contract Amt.	\$30,000	Contract Cost to Complete	\$30,000
Contract Costs to Date	\$0	Project Cost to Complete	\$39,000

IMPLEMENTATION PLAN

STATUS

Behind schedule

	TASK PRO	000000000000000000000000000000000000000		20	<u> </u>	••••	200000	20	06 -		r	20	07	T	~~~	200	38	••••
NO.	TASK		Q1			Q4	01			Q4	Q1			Q4	01			
1	Define scope with TAC	Est.																ļ
	50.1% Stope	Act.		-	<u> </u>													-
2	Define the evaluation device	Est.											ļ					
c.		Act.				ļ	<u> </u>			ļ			<u> </u>					-
3	Monitor data and get the bugs out	Est				_	ļ		ļ	ļ	ļ		_	_				-
		Act.			<u> </u>	_	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>			·····			
4	Collect data without the device on	Est.	ļ			<u> </u>	ļ	<u> </u>	ļ	ļ	ļ						ļ	
		Act.	1				ļ		<u> </u>	 	4-	ļ	<u> </u>	-				•
5	turn on the device	Est.	 	-			ļ	ļ	ļ	 -	ļ	ļ	 	-		<u> </u>		
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6	behavior after the device to on	Est.	<u> </u>	ļ		3		· [,	ļ	1_	-				ļ	ļ	
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7	collect more data	Est.	1	ļ		-	~] (·····	,		.	<u> </u>	ļ	_	-		ļ	 	•
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8	Deliver results	Est	.	ļ	ļ	_	_	_		.	.	ļ		ļ	ļ	ļ	ļ	
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little		Down-dra	ig of Piles
Fund. Source	SPR	Project Type	Research Project
Charge ID	81FR9968	Performing Org.	Brigham Young University
PIC	UT98.504	Contract No.	05-9112
Project Mgr.	Leonard	Contract Start Date	8/1/04
Princ, Inv.	Rollins	Contract End Date	2/1/06
College Section 1		FISCAL	
Contract Amt.	\$45,327	Contract Cost to Complete	\$45,327
Contract Cost to Date	\$0	Project Cost to Complete	\$58,925
		OBJECTIVE	

Settlement of fills in embankment for bridge foundations often cause skin friction of the piles. This skin friction can decrease the structural load capacity of the piles. Engineers on the I-15 project considered the skin friction question the major unknown affecting pile performance, potentially increasing foundation costs by 50% or more. This project will gather full scale field data to improve our understanding of these downdrag forces, based on pile instrumentation at two sites.

IMPLEMENTATION PLAN

Verity the magnitude and nature of downdrag forces and modify our design procedures accordingly. Modify the geotechnical and structural manuals of instruction with this updated design information for use on future projects.

STATUS

Pile instrumentation and data gathering is underway. Coordinating pile driving with contractors on two project sites: 1-15 in Springville and the Salt Lake International Airport.

***	TASK PROGRES			20	X)4			20	05			200	X 6			200	17
NO.	TASK		Q1		03	04	Q1		03	04	Q1	022		04	Q1	Q2	03
1	install instruments	Est.															
		Act.														_	********
2	Soil testing	Est.						Chromotopic (
		Act.			_												
3	Measure axial force vs. settlement	Est.	<u> </u>	_	L	<u> </u>											
		Acl	<u> </u>		<u> </u>						<u>L</u>						
4	Evaluate methods	Est.	_	ļ	_	_		_				L					
		Act.	_	<u> </u>	_		<u> </u>	<u> </u>	<u> </u>	ļ	 	ļ					~~~
5	Final report preparation	Est	 	<u> </u>	4	<u> </u>	ļ	_	<u> </u>		!	ļ					
		Act.	<u></u>	ļ	1	ļ	<u> </u>	_	<u> </u>	<u> </u>	<u>_</u>						-
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Title		Hydrodynamic Separators as	Stormwater Best Management Practices
Fund. Source	SPR	Project Type	Hydraulics/Environmental
Charge ID	81FR0215	Performing Org.	Stantech Consulting Inc.
PIC	UT01.306	Contract No.	04-9130
Project Mgr.	Wakil	Contract Start Date	2/13/2004
Princ. Inv.	Nichols	Contract End Date	4/13/2005
	7747	FISCAL:	the state of the s
Contract Amt.	\$49,526	Contract Cost to Complete	\$0
Contract Costs to Date	\$49,526	Project Cost to Complete	\$0

This project consists of the preparation of a selection methodology and a performance-based specification for oil-water separator devices. Presently, UDOT does not have a standard for designing, selecting, installing or maintaining these types of devices. It would help designers if a standard selection methodology was available to help in choosing an appropriate oil-water separator for transportation projects.

IMPLEMENTATION PLANS

UDOT Special Provision for Designing and Selecting Oil-Water Separator

STATUS

This project is completed.

***	TASK PROGRESS TASK			20	02			20	03			20	04			200)5	
NO.	TASK		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	01	Q2	Q3	Q4
1	Identify typical pollutants and average concentrations	Est.																
		Act.	<u> </u>				L											L
2	Evaluate hydrological characteristics	Est.																
2.	Z. W. Galler, V. G.	Act.																
3	Review existing UDOT information and meet with Yechnical Advisory	Est.																
3	Committee	Act.																
4	Identify technical/performance data from manufactures and State DWQ	Est.																
7	manuf walling personal and a second s	Act.																
5	Prepare Selection Methodology	Est																
3	Prepare Gereaun memoussy	Act.															L	
£	Prepare performance Specification and Final Report	Est.																
6	гтерате реголивняе вресивания али глав пером	Act.	T	T	T	T	Γ				1							

litte		Develop Utah We	etlands Functional Assessment Method
Fund, Source	SPR	Project Type	Environmental
Charge ID	81FA0214	Performing Org.	Utah State University
PIC	UT01.301	Contract No.	04-9044
Project Mgr.	Leonard	Contract Start Date	1-Apr-03
Princ. Inv.	Johnson	Contract End Date	1-Jul-06
A Maria Property	C40-1-1 (20)	FISC	AL SECTION OF THE SEC
Contract Amt.	\$50,930	Contract Cost to Complete	\$34,206
Contract Cost to Date	\$16,724	Project Costs to Complete	\$44,468

To develop a wetlands assessment method specific to the conditions in Utah, based on the current Montana methodology. The assessment method will take into considerations wetland quality or functional value, including water quality, flood storage, contiguous or isolated waters, wildlife habital, food chain support, and sediment control, rather than just total acerage. The method will be a logical, time efficient, analytical, reproducible evaluation technique for use in Utah, yielding more sustainable wetlands. It must be accepted by the Army Corps of Engineers.

MPLEMENTATION PLAN

A Manual of Instruction will be developed for the new method, and Army Corps of Engineers approved will be sought for the Manual. Forms will be developed for use with the technique. Potential users of the method within UDOT and related outside organizations will be involved in the process and will be familiar with the method as it is developed. Two training sessions will be held for UDOT personnel and consultants to provide full instruction on the use of the method. The method will become the primary tool for wetland assessment on UDOT projects.

STATUS STATUS

Project Underway. Field review of wetland classification types has been completed. Workshop with users and agencies has been held to evaluate various aspects of the proposed method. Manual of instruction nearly completed. Training session has been completed. Corps: mandated additional field testing & verification to insure the uniform application of the method. Contract was modified accordingly to include phases 3 through 6 and the field testing is being planned.

NO.	TASK			20	02		I	20	03			20	04			20	05			200	16
~O.	IACA		Q1	022	03	04	Q1	Q2	CO	G#	01	02	Q3	04	01	C)2	G3	04	Q1	<u>œ</u>]	Õ3
1-3	Literaturs Review, coordination with Montana DOT, Revisard Problem Statement	Est.																			
**********		Act.													<u> </u>				_	_	
4-6	identify Westand Classifications and Functional Unit Criteria for Utah, coordinate with US Anny Corps of Eng., Draft Manual of Instruction	Est.					<u>L</u>					20500	5000		-					_	,
****	Anny Copps of Eng., Islan warner in meachann	Act	<u> </u>			L	_									<u> </u>					
7	Army Corp of Engineers Interim: Approval	Est.	<u> </u>		L			_	_				<u> </u>	<u> </u>							
		Act.	_		<u> </u>		L	<u> </u>							L						
8-10	Finalize Manuel of Instruction and Standardized Forms, prepare linel report	Eet.																			
~		Acs.	L	L			L		_												_
11	Training Sessions for UDOT and Consultants	Est																			
	Training Operation of Operation Continues no	Act.																			
Phase III	Field Teeting the UDOY Method by outside groups (UWAG)	Est																			
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Phase IV	Freid Testing live other Mothods for comparison	Est.														*					
·	r cent researcy more sound retail and consequences	Act																			
Phose V	Field testing the UDOT Method by UDOT Staff	Est.													Ι	Ι					
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Title	Cond	lition of Existing Highway Culverts and De	termination of Performance Measures
Fund. Source		Project Type	
Charge ID	81FR0232	Performing Org.	Simpson, Gumpertz & Heger
Project No.		Contract No.	#03-9097
Project Mgr.	B. Leonard	Contract Start Date	25-Sep-02
Princ. Inv.	T. McGrath	Contract End Date	30-Jul-04
	i According to Tarres	FISCAL COM	
Budget (orig.)	\$156,700	Est. cost to Complete	
Costs to date	·····	Est. Current FY Cost	
Budget (orig.) Costs to date	\$156,700		

Assess coivens throughout the state to:

- determine the condition of existing highway culverts and storm drains with spans of two to five feet,
- develop a system of qualitative and quantitative measures to assess both the short- and long-term performance of highway culverts and storm drains, determine the performance measures which affect and predict performance, and
- make recommendations to the UDOT on better methods to track and monitor the performance of highway culverts and storm drains.

IMPLEMENTATION PLAN

Provide a new database tool which supports the continued inspection and evaluation of culverts, review and update desgin criteria and specifications relative to culvert installation, and recommend a maintenance program for culverts.

STATUS

Project completed. Final report UT-04.05 "Condition Assessment of Highway Culverts and Determination of Performance Measures." Implementation underway including modifications to culvert specifications.

	TASK PROGR			20	02			20	03	1	ł	20	04			200	75	
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		Est.															-	
1	Start up / Review Database	Act.					t.											
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2	Identify List of Target Culverts	Act.																
		Est.																
3	Detailed Work Plan for Inspection, Assessment	Act.																
*	Inizrim Report	Est																L
4	विकास संबंधित	Act.																L
5	Field Surveys	Est.												<u> </u>				L
5	Prid Surveys	Act.					Ŀ											L
	Analysis of Findings	Est,											_	_				
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7	Update UDOT Database	Est.					_				_		_					L
,	Oposite (IOC) i Distances	Act.					Ŀ			1						<u> </u>		_
6	Final Report	Est.											_	_	_			_
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Title		Long Term Monitoring of I-15 Embankma	ent Performance, Ph. 2
Fund. Source	SPR	Project Type	Geotechnical
Charge ID	81FR0292	Performing Org.	University of Utah
PIC	TB98.029	Contract No.	pending
Project Mgr.	Leonard	Contract Start Date	1~Jul-05
Princ. Inv.	Bartlett	Contract End Date	31-Dec-08
		FISCAL	
Contract Amt. (est.)	\$150,000	Contract Cost to Complete	\$150,000
Contract Cost to Date	\$0	Project Cost to Complete	\$195,000

Monitor the performance of embankments in several locations along the I-15 Fleconstruction corridor, including embankments constructed with MSE walls over native soils treated with lime-cement columns, embankments constructed over wick-drain treated areas, embankments constructed using lightweight EPS Geofoam, and other innovative construction types. Monitor long-term consolidation of soft clay subsoils subjected to these embankment loads. Model the deformations of the subsoils and evaluate the consolidation properties of these soils. This is the second phase of this monitoring work.

IMPLEMENTATION PLAN

20 Page 10 Pag

Develop guidelines for the future construction of embankments over soft soils and the evaluation of soil properties for these soft soils.

STATUS

Monitoring equipment was installed during the I-15 embankment construction and a report prepared documenting that installation. Instruments continue to be read on a regular basis, and the data evaluated. Report published: UT-03.17: "Geofoam Fill Performance Monitoring", Aug 03. GIS database of installed instrumentation and related geotechnical data has been completed. Reports which have been prepared to document embankment performance include: UT-04.18: "Numerical Modeling of Settlement Behavior of Treated and Untreated Foundation Soils Underlying MSE walls for the I-15 Reconstruction Project, SLC, Utah", and UT-03.20: "Estimation of Preconsidation Stress and Compression Ratio from the Field and Laboratory Measurements from the I-15 Reconstruction Project", and UT-04.19: "Monitoring and Modelling of Innovative Foundation Treatment and Embankment Construction Used on the I-15 Reconstruction Project, Project Management Plan and Instrumentation Installation Report.", and UT-04.20: "Estimation of Consolidation Properties from In-Situ and Laboratory Testing."

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2	Analysis of field data	Est															tor ,	
۴	Principles of freed data	Act.																
3	Final report and recommendations	Est.																
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Continue to maintain that performance and long term deformation of MSE walls at 1-15 and 3500 S. This is the second phase of a project to evaluate these innovative walls are deformed by the following of the future design and construction of MSE walls over soft soils. STATUS	·····				•••••		~~~~					~~~~								
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Title		Assessment and Prioritization of UDOT Life	elines and Identification of Critical Bridges
Fund. Source	SPR	Project Type	Structures
Charge ID	81FR0342	Performing Org.	pending
PIC	UT02.501	Contract No.	pending
Project Mgr.	Berg	Contract Start Date	pending
Princ. Inv.	pending	Contract End Date	pending
		FISCAL	The Company of the Lagrange and the company of the
Contract Amt.	pending	Contract Cost to Complete	#VALUEI
Contract Costs to Date	\$0	Project Cost to Complete	#VALUE!

OBJECTIVE

1. Identification and ranking of UDOT corridors that are critical lifelines in Utah.

IMPLEMENTATION PLAN

The data would be used to more effectively allocate resources for maintenance activies on existing structures. Other UDOT groups could also use the data in the design process and other decision making processes.

STATUS

The Structures Division is interested in outsourcing the work to a private consultant and is currently evaluating possible firms to offer proposals.

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NO.	TASK		Q1		******	Q4	Q1	Q2	وووسناها	Q4	Q1 (Q2	ومسمسي	Q4	Q1	02	·····	Q4
1	Literature search	Est.							*****									
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2	Coordinate with other agencies to assess similar work.	Est.			ļ	ļ				ļ								-
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3	Review the information available in UDOT's bridge database	Est.	 		ļ	-				ļ			ļ					-
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4	Review UDOT's available GIS information. Identify every location of schools, hospitals, churches, airports, fire stations, etc.	Est.	<u> </u>	ļ	 	ļ		ļ	ļ	ļ	 		-					
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-5	Establish criteria for ranking lifeline criticality, including emergency responses, treatith care, airport access, military facilities, user costs, significant economic	Est.	ļ	ļ	ļ	ļ	ļ	ļ	ļ	 	ļ	ļ	ļ	ļ	ļ			
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6	Review the criteria with UDOT stakeholders	Est.	<u> </u>	ļ	<u> </u>	_	<u> </u>		_		<u> </u>	<u> </u>	<u> </u>				-	-
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7	Develop a map of those critical bridges and a list of bridges in priority order.	Est.	<u></u>	ļ	ļ		ļ	ļ	ļ	ļ			ļ	ļ	ļ		<u> </u>	_
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8	Incorporate critical routes into PONTIS database. (UDOT task)	Est.			1		<u> </u>	ļ	ļ	<u> </u>	<u> </u>	<u> </u>		<u>L</u> .	ļ		ļ	
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9	Coordinate with Planning and Asset Management to incorporate criticality	Est.		_			_		_		_	_		1		ļ	ļ	_
3	designations into their systems.	Act.					_		_		_		<u></u>		<u></u>			
40	Modify Structures Manual of Instruction to incorporate critical rankings into the	Est														1	<u> </u>	
10	design process.	Act																

Title		Evaluate Traffic and	Safety Initiatives
Fund. Source	SPR	Project Type	Traffic & Safety
Charge ID	81FR0341	Performing Org.	BYU
PIC	UT02.401	Contract No.	03-9153
Project Mgr.	Lindsey	Contract Start Date	2/15/2003
Princ. Inv.	Saito	Contract End Date	2/15/2005
September 1995 Berlinder		FISCAL:	er i de la
Contract Arnt.	\$83,000	Contract Cost to Complete	\$32,950
Contract Cost to Date	\$50,060	Project Cost to Complete	\$42,835

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itle		Evaluation Study of Advanced Sig	nal Waming Devices
und. Source	SPR	Project Type	Traffic & Safety
Charge ID	81FR0515	Performing Org.	BYU
PIC	AM05.001	Contract No.	05-9046
roject Mgr.	Lindsey	Contract Start Date	7/1/2004
Princ. Inv.	Schultz	Contract End Date	7/1/2006
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Contract Amt.	\$30,000	Contract Cost to Complete	\$30,000
Contract Costs to Date	\$0	Project Cost to Complete	\$39,000
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NO.	TASK PROGRESS TASK			20	05			20	06			20	07			20	08	
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		GENERAL	
Title	Ą	ssessment and Prioritization of Ut	DOT Lifelines and Identification of Critical Bridges
Fund. Source	SPR	Project Type	Structures
Charge ID	81FR0342	Performing Org.	pending
PIC	UT02.501	Contract No.	pending
Project Mgr.	Berg	Contract Start Date	pending
Princ. Inv.	pending	Contract End Date	pending
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Contract Amt.	pending	Contract Cost to Complete	#VALUE!
Contract Costs to Date	\$0	Project Cost to Complete	#VALUE!
		OBJECTIV	E de la Company de la Comp

1. Identification and ranking of UDOT corridors that are critical lifelines in Utah.

IMPLEMENTATION PLAN

The data would be used to more effectively allocate resources for maintenance activies on existing structures. Other UDOT groups could also use the data in the design process and other decision making processes.

STATUS AL SAL

The Structures Division is interested in outsourcing the work to a private consultant and is currently evaluating possible firms to offer proposals.

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4	Review UDOT's available GIS information, Identify every location of schools,	Est.		<u> </u>	<u></u>	<u></u>												ļ
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6	Review the criteria with UDOT stakeholders	Est.		ļ	ļ		<b> </b>	ļ	<u> </u>		<b>_</b>		ļ		ļ	ļ		ļ
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7	Develop a map of those critical bridges and a list of bridges in priority order.	Est.	<u> </u>	 	ļ	ļ	<u> </u>	ļ	ļ	ļ	 	<u> </u>	ļ	ļ				+
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8	incorporate critical routes into PONTIS database. (UDOT task)	Est.	_	_		1_	<u> </u>	ļ	ļ	<u> </u>	ļ	ļ		l	<u> </u>	ļ	ļ	~
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Fund. Source	SPR	Project Type	Traffic & Safety
Charge ID	81FR0341	Performing Org.	BYU
PIC	UT02.401	Contract No.	03-9153
Project Mgr.	Lindsey	Contract Start Date	2/15/2003
Princ. Inv.	Saito	Contract End Date	2/15/2006
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Contract Amt.	\$83,000	Contract Cost to Complete	\$32,950
Contract Cost to Date	\$50,050	Project Cost to Complete	\$ 42,835

IMPLEMENTATION PLAN

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Title		Evaluation Study of Advanced Si	gnal Warning Devices
Fund. Source	SPR	Project Type	Traffic & Safety
Charge ID	81FR0515	Performing Org.	BYU
PIG	AM05.001	Contract No.	05-9046
Project Mgr.	Lindsey	Contract Start Date	7/1/2004
Princ. Inv.	Schultz.	Contract End Date	7/1/2006
	at tripe are to	FISCAL:	
Contract Arm.	\$30,000	Contract Cost to Complete	\$30,000
Contract Costs to Date	\$0	Project Cost to Complete	\$39,000

IMPLEMENTATION PLAN

STATUS

NO.	TASK			20	05	1		20	06	1	١.	20	U/			200	
NO.		~~~~	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	01	Q2	03
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litte		Implementation of 2002 AASHTO Design Guide	
und, Source	SPR	Project Type	Design
Charge ID	61FR0343	Performing Org.	ERES Consultants
PIC	UT02,204	Contract No.	03-9185
Project Mor.	Doug Anderson	Contract Start Date	4/1/2003
Princ. Inv.	Darter	Contract End Date	12/31/2005
		FISCAL	
Contract Amt.	\$148,579	Contract Cost to Complete	\$52,787
Contract Cost to Date	\$95,592	Project Cost to Complete	\$68,623

Implement the 2002 AASHTO Pavement Design Guide at UDOT. This is the first contract in a series of initiatives to get the new guide calibrated and functioning. We believe that we are two years into a five year effort.

IMPLEMENTATION PLAN

Separate Double Control

1- identity the lab equipment needed to conduct the required materials testing. 2- Recommend traffic data gathering plans to obtain quality vehicle class and weights. 3- Train designers on how to apply the software to obtain an accurate design with the new guide both in-house and out-of-house. 4- Use the new guide to design various flexible and rigid pavements for comparison with the existing methods. Both new construction and rehabilitation projects will be included.

STATUS STATUS

A draft of the Final Report has been written. The report contains very useful comparisons of actual performance with projected performance from the design guide. A presentation is ready for the QIC, and will be scheduled for June 2005.

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NO.	TASK		Q1	022	03	×	34 C	2	Q3 C	W I	<u> </u>	02]	03	04	01 0	2	9
	Develop a detailed work plan	Est.					1	1		_		_				1	
	perent a serated work plan	A42.	ļ			_	1	_	_	4	4	_	_		_	4	-
2	Identify the requirements, resources, and time constraints to implement the guide into UDOT	Est.				_	4	4	4	4	4		4		_	4	
~	practice	Act.	┿		-		4	4	4	4		-	-		-	4	
3	Determine the impacts to UDOT of adopting the guide	Est.	4	-	\vdash	}	-		4	4	4		1		\vdash	-	•••
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4 .	Document the study activities and outline the implementation plan	Act	+	+-	\vdash		+	-	+	+	-				H	7	200
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litle	Web Based Pavement Condition	n and Traffic Information	
Fund, Source	SPA	Project Type	
Charge ID	81FR0346	Performing Org.	
PIC		Contract No.	03-9102
Project Mgr.	Doug Anderson	Contract Start Date	
Princ. Inv.		Contract End Date	
		FISCAL	
Contract Amt.		Contract Cost to Complete	\$0
Contract Costs to Date	\$0	Project Cost to Complete	\$0

Web enable pavement condition and traffic information for efficient application. The data witi be accessed by section, distress type, trend information, or system searches for failures. The information will be delivered through the same web page as the crash data.

IMPLEMENTATION PLAN

Train end users on how to conduct queries to down-load the information. Various pavement management applications will be enhanced. The web page will ultimately contain design data for use in the AASHTO Design Guide. All data sets will be rolled out to the users through the "UDOT Data Almanac".

STATUS A PROPERTY OF THE PROPE

This system is complete, and beta testing has been done. Training is planned for summer of 2005 as part of the Data Almanac web site. We believe that this system will have significant impact on our pavement management program, asset management initiative, pavement maintenance, traffic and safety spot improvement program, and

	TASK PROGRESS	TAB	LE			S. Oak	34	.96.3		///	100				Cate a			
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		Est.	01	Q2	Q3	Q4	<u> </u>	Q2	Q3	Q4	<u>01</u>	QΣ	C)3	Q4	Q1	C22	C33	04
1	Design database structure	Act.				 			••••	-			-					<u> </u>
2	Develop software and screens	Est.																
۵.		Act									<u> </u>							
3	Test system	Est.													<u> </u>			<u></u>
		Act.	<u> </u>	ļ	ļ	ļ	ļ	ļ		ļ			ļ	<u> </u>	<u> </u>			<u></u>
4	Publish Final Report	Est.	<u> </u>		ļ	ļ	ļ	ļ	ļ	ļ		ļ	ļ	ļ	ļ	<u> </u>	-	ļ
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5	Conduct training	Est	 	-	 	 	<u> </u> _	-	-	-				 	ļ	ļ	 	
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little		Vehicle Feature E	xtraction
und, Source	SPR	Project Type	Program Development
Charge ID	81FR0347	Performing Org.	USU
PIC	AM03.004	Contract No.	04-9007
Project Mgr.	Doug Anderson	Contract Start Date	6/1/2003
Princ. Inv.	Cheng	Contract End Date	12/31/2004
		FISCAL	
Contract Arnt.	\$45,400	Contract Cost to Complete	\$0
Contract Cost to Date	\$45,400	Project Cost to Complete	\$0

Count and classify vehicles utilizing TOC cameras and portable cameras mounted on bridges or poles using fuzzy logic and image recognition software.

IMPLEMENTATION PLAN

Replace the time consumming manual counts with camere and advanced software. This will improve the accuacy of the information while enhancing efficiency and safey of the counting program.

STATUS 15 STATUS

Model is done. TOC demonstration in April.

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4	Install at TOC and the Planning Division	Est.	+-	-	-	ļ	ļ	ļ	ļ		ļ	 	 		-		
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Title		Development of Road User Cost	Evaluation Tool
Fund. Source	SPR	Project Type	Program Development
Charge iD	81FR0510	Performing Org.	BYU
PIC	H005208H	Contract No.	04-9090
Project Mgr.	Anderson	Contract Start Date	11/1/2003
Princ. Inv.	Saito	Contract End Date	10/31/2005
		FISCAL	
Contract Amt.	\$35,000	Contract Cost to Complete	\$35,000
Contract Cost to Date	\$0	Project Cost to Complete	\$45,500
		OBJECTIVE	

1. Evaluate state of practice of user costs estimation procedures used by other states (processes, models, assumptions). 2. Evaluate major software used for user costs estimation. 3. Develop user costs estimation procedures (\$, software considering travel time variability). 4. Prepare guidelines for implementing the developed user costs estimation procedures (How much do we weigh user-costs? 5. Develop policy statement (draft)

IMPLEMENTATION PLAN

1. Develop consistent estimation of user costs. 2. Standardized user cost estimation procedures with its tables, nomographs and spreadsheets. 3. Training and distribution of software.

STATUS A STATUS

Underway. This tool will be used for corridor level user impact analysis. Within the User Impact Planning policy this method will be used on Level 2 and Level 3 projects. These are generally rural routes where bypass routes do not exist. The model has been shown to be more accurate in these areas. (Level 1 projects are best evaluated with a system model which considers bypass routes.) The tool will be used in-house by project managers and other UDOT personnel.

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3	Evaluate software capabilities of other states	Act	1	†	1	T	1	<b> </b>	1	1			<b> </b>				i
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4	Develop UDOT's user costs evaluation procedure		ļ	-		╂	ļ.,,,,	╂	┿	┿	╀-		-	H			ļ
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5	Prepare case studies	Aet	T	T	1	1	<b>T</b>	T	T	T	1	1	Γ	T			
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6	Develop guidelines for selecting an appropriate procedure and draft policy	Act.	╁	╫	+-	+-	╁┈	╫	╁┈	+	╁┈	╅┈	+	╅┈	<del> </del>	-	٣
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Title	Material	s Characterization for the AASI	tTO 2002 Pavement Design Guide, Ph. 2
Fund. Source	SPR	Project Type	Pavements, Materials
Charge ID	81FR0511	Performing Org.	ERES Consultants
PIC	UT03.203ph2	Contract No.	pending
Project Mgr.	Anderson	Contract Start Date	pending
Princ. Inv.	pending	Contract End Date	pending
		FISCAL	
Contract Arnt.	pending	Contract Cost to Complete	\$50,000
Costs to date	\$0	Project Cost to Complete	\$65,000

1. Calibrate Pavement Design Guide for Utah conditions. 2. Determine testing equipment necessary for evaluation of Utah material.

## IMPLEMENTATION PLAN

Determine equipment needs. 2. Review current equipment evaluation process. 3. Purchase necessary equipment. 4. Determine necessary properties of material to be used for AASHTO 2002 Design Guide.

## STATUS (**

Underway. Working on finalizing contract.

1	TASK PROGRE			20	04			200	)5			20	06			2007	
NO.	TASK		Q1	Q2	<b>Q3</b>	04	Q1	CIS	03	04	01	02	C3	04	Q1	O5 0	3 0
1	Minture stiffness characterization and permanent deformation database	Est.															_
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2	Unbound material characterization with result database	Est		ļ													4
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3	Develop and implement into construction practices	Est.	<u> </u>			-	<b> </b>					ļ	-	-		<b></b>	4
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Title		Impacts of Rai	sed Medians
Fund. Source	SPR	Project Type	Safety
Charge ID	81FR0513	Performing Org.	pending
PIC	UT03.503	Contract No.	pending
Project Mgr.	Anderson	Contract Start Date	pending
Princ. Inv.	Rena Powers Media	Contract End Date	pending
		FISCAL	
Contract Amt.	pending	Contract Cost to Complete	\$70,000
Contract Cost to Date	\$0	Project Cost to Complete	\$91,000

1. Determine effects of raised medians on safety, capacity, business. 2. Determine effects of U-turns on safety and businesses. 3. Determine effectiveness of raised medians without other forms of access management. 4. Determine pedestrian benefits of raised medians.

## IMPLEMENTATION PLAN

1. Develop UDOT policy/guideline for raised medians. 2. Have available quantitative, local data on the impacts of raised medians that can be used when working with the public.

# STATUS

Contract finalized. Underway

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1	Collect and analyze accident data for highways with and without medians.	Est.															
'	Control and analyze account some on the major will be a second	Act.															
2	Compere capacity and LOS of highways with and without raised medians to determine the	Est.															
	benefit of the raised medien.	Ast.															••••
	Study economic impacts of raised medians on business by studying business before and	Est.															
3	after the installation of the raised median (both long and short term). Compare economic impacts for businesses on highways with and without raised medians.	Act.															
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Title	Fast Track Contracting (Merged to "User Impact	Planning")	
Fund, Source	SPR	Project Type	
Charge ID	81FR0333	Performing Org.	
Project No.		Contract No.	02-9165
Project Mgr.	Doug Anderson	Contract Start Date	
Princ. Inv.		Contract End Date	
		FISCAL	
Budget (orig.)		Est. cost to Complete	
Costs to date		Est. Current FY Cost	
		ORJECTIV	F

Determine the impacts on commuters during the I-15 Reconstruction Project. Estimate the time impacts, safety impacts, and the air quality impacts for various scenarios.

## IMPLEMENTATION PLAN

1- Use the findings to promote and justify the use of innovative contracting methods. 2- A presentation was given to key leaders at UDOT. 3- An article was published in a national trade magazine. 4- Use the model created during the study to estimate user impacts on STIP projects within the SL Area.

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Completed. Followup required in 2005, 2006 and 2007. The User Impact Planning program has been Implemented at UDOT. A new contract in place with the U of U Traffic Lab to use their traffic model to analyze contracting methods, project timing, and the value of incentives to contractors. STIP projects for analysis have been identified in Reg. 1, 2, and 3.

	TASK PROGRESS	ong photolical		20	02			200	)3			20	04			200	<b>)</b> 5	
NO.	TASK		01	G2	Q3	04	01	Q2	СiЗ	Q4	01	CL2	CQ3	Q4	Q1	Q2	Q3	Q4
		Est.																
1	Complete implementation	Act.																_
2	Follow up on program application	Est.																-
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		GENERAL	
Title	Utah Long Term Pavement F	Performance Program (LTPP) f	or Superpave
Fund, Source	Federal	Project Type	
Charge ID		Performing Org.	
PIC		Contract No.	
Project Mgr.	Doug Anderson	Contract Start Date	
Princ, Inv.		Contract End Date	
		FISCAL	
Contract Amt.	\$50,000	Contract Cost to Complete	\$50,000
Contract Costs to Date	\$0	Project Cost to Complete	\$65,000
1.5	Sales and the sales and the sales are sales and the sales are sales and the sales are	OBJECTIV	

UDOT lacks the data to validate current Superpave construction practices, how these mixes relate to pavement management models, and the data to validate materials performance models. This project will evaluate the performance of the early Superpave sections to determine these aspects.

IMPLEMENTATION PLAN

With the performance data in hand UDOT experts will be able to determine the benefit/cost of Superpave in Utah. We will know if improvements are needed or if we are currently receiving the value from these mixes.

STATUS

New project. A detailed work plan has been submitted by the U of U for review. This project is part of our "Materials Research Program". A super TAC will provide oversight on this project and the others in the program. All Region Materials Enginneers and Region Pavement Management Engineers will serve on the TAC

NO.	TASK PROGRESS TASK				05			20	*****			*****	07			200		
NU.	AGA		Q1	022	Q3	Q4	ā	02	C3	Q4	Q1	02	C)3	Q4	Q1	Q2	Q3	O.
1	Delineate anticipated applications of data	Est.																
'		Act.																_
2	Define study parameters	Est.																
٠.		Act.																
3	Identify Superpave pavement sections to monitor	Est.									<u></u>	_						1
		Act.																-
4	Establish data collection protocols and instrumentation for obtaining	Est.		1	_	_	<u> </u>		ļ	_	_	_						-
**	materials, traffic, environmental, and other relevant information	Act.			_	_					_			<u> </u>				-
5	Design and construction of retrievable database for storage and summary	Est.					_		<u></u>	<u></u>		_	_	_				,
J	of collected data.	Act.	_									_		<u> </u>				
6	Estimate the benefit/cost for Superpave mixes in Utah.	Est.				_	_				_	_	<u> </u>		L			
•		Act.															ļ	
7	Recommend improvements to UDOT's mix design process	Est									<u> </u>				ļ		ļ	_
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Title	SMA Paving Mechanistic I	Properties	
Fund, Source	Federal	Project Type	
Charge ID		Performing Org.	
PIC		Contract No.	
Project Mgr.	Doug Anderson	Contract Start Date	
Princ. Inv.		Contract End Date	
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Contract Amt.	\$100,000	Contract Cost to Complete	\$100,000
Contract Costs to Date	\$0	Project Cost to Complete	\$130,000

With the growing use of Stone Matrix Asphalt pavement (SMA) it's mechanistic design properties: resilient modulus, dynamic modulus, flexural strength and cold weather cracking susceptibility, need to be known to full benefit of its contribution to the paving system. The information to be gathered/evaluated would be resilient modulus and dynamic modulus of SMA mixes used in Utah. Additional test to be run on selected mixes to get the cold weather and fatigue and other information le. Bending beam TSRT letc. These tests could be run at UNR or other Superpave center throughout the country.

## IMPLEMENTATION PLAN

Better understanding of the SMA design parameters will allow the pavement designer to optimize the use of SMA in pavement design and realize cost savings in the overall pavement system. 1. Interim reports to indicate current experience and best to date design assumptions for modulus and other design inputs. 2. Final report to summarize data and provide guidelines for SMA design and use. 3. Materials Library data values 4. SPT FOP

## STATUS .....

New project. A detailed work plan is being drafted. This project is part of our "Materials Research Program". A super TAC will provide oversight on this project and the others in the program. All Region Materials Engineers and Region Pavement Management Engineers will serve on the TAC.

***************************************	TASK PROGRESS			20				20		*****	·	20				200	8	
NO.	TASK		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	01	Q2	Q3	<b>G</b> 4	Q1	Q2	<b>Q3</b>	04
1	Develop a testing strategy and data collection process for Dynamic Modulus data using the Simple Performance Testers that are to be in place at each	Est.										ļ						ļ
	Region, and non-DOT testing devices for calibration and correlation.	Act.																
2	Evaluate data from modulus testing to determine default values for pavement design grades.	Est.					ļ	ļ				ļ	-	ļ	ļ			_
	paventeur design games.	Act.						<u> </u>		ļ	<u> </u>	_	ļ	ļ	ļ	-		ļ
3	Develop testing strategy and implement testing strategy to develop cold	Est.	<u> </u>	ļ			<u> </u>	_		ļ	ļ	ļ	ļ					ļ
	weather and fatigue data.	Act.				ļ	_	<u></u>			ļ	<u> </u>	<u> </u>					_
4	Evaluate data from testing and develop appropriate design guide input and	Est.		_	_			_	ļ	<u> </u>	_	_	_	ļ	<u> </u>			ļ.,
7	department guidelines	Act.								_		ļ			ļ			_
5	Populate Materials Library for the ME Design Process	Est				_	_			_	_	_		_	<u> </u>			1
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6	Crunch designs to validate inputs	Est.	<u> </u>		_						_				_	<u> </u>		_
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-,	Evaluate previous placements from 2004	Est.					_		_						_			1
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	Review alternative procedures for evaluating existing pavement sections	Est												J			ļ	1
8	that are thinner than requirements	Act					_				_				_			_
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400		GENERAL	
Title	Materials Characterization	for the Mechanistic/Empirical Par	vernent Design Guide
Fund. Source	Federal	Project Type	
Charge ID		Performing Org.	ERES Consulting
PIC		Contract No.	
Project Mgr.	Doug Anderson	Contract Start Date	
Princ. Inv.	Darter/VonQuintas	Contract End Date	
37.75 P. 17.75 P. 17		FISCAL.	
Contract Amt.	\$150,000	Contract Cost to Complete	\$150,000
Contract Costs to Date	\$0	Project Cost to Complete	\$195,000
		OBJECTIV	to the same of the same of the same of the same

Determine necessary material properties required for input into the new Mechanistic/Empirical Pavement Design Guide for Utah conditions. Populate the Materials Library as data becomes available. Continue to implement the new guide into UDOT's practices.

## IMPLEMENTATION PLAN

Modify the laboratory testing, traffic data gathering, environmental inputs, and various design traffic inputs as necessary. Train all users and data suppliers.

## STATUS STATUS

New project. This is the second of a series of projects to implement the new guide. A two-year detailed work plan is being prepared for review.

	TASK PROGRESS			20	05			20	90			20	07			200	18	
NO.	TASK		Q1	Q2	Q3	Q4	01	Q2	C23	Q4	Q1	Q2	Q3	Q4	Q1	O22	<b>Q3</b>	O
1	Determine equipment needs	Est								ļ								L
		Act				<u></u>	<u> </u>			<u> </u>	<u> </u>	_					*******	-
2	Review current equipment evakuation process	E\$1.				ļ			ļ	ļ	<u> </u>		ļ				نسب	1
<del>-</del>		Act				<u> </u>	<u> </u>	ļ			<u> </u>	ļ	ļ	ļ			-	1
3	Purchase necessary equipment	Est.		<b></b>		_	<u> </u>	ļ		_	_	_	ļ	ļ	ļ			-
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4	Determine necessary properties of material to be used for AASHTO 2002 design	Est.	<b>_</b>		_	_	_	ļ	<u> </u>	_	_	<u> </u>	ļ	_	ļ			~
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îtle	Full-Depth Recycling and S	tabilization of Pavement Base L	ayers
Fund. Source	FHWA	Project Type	
Charge ID		Performing Org.	BYU
PIC .		Contract No.	
Project Mgr.	Doug Anderson	Contract Start Date	
Princ, Inv.	Dr. Spenser Guthrie	Contract End Date	
		FISCAL	
Contract Amt.	\$100,000 pending	Contract Cost to Complete	#VALUE!
Contract Costs to Date	\$0	Project Cost to Complete	#VALUE!

The use of full-depth recycling (FDR) for reconstructing deteriorated asphalt pavements is advantageous from engineering, environmental, and economics perspectives. Last year UDOT utilized the FDR process in conjunction with cement stabilization to reconstruct Interstate 84 near Morgan. The project raised several questions about the design, construction, and performance of recycled, cement-stabilized layers. For example, what is the maximum permissible ratio of reclaimed asphalt pavement (RAP) to base? How is the optimum stabilizer type and content selected? How does one know when to open the stabilized layer to traffic? How does one quantity the benefit of stabilization with respect to both strength and durability? Research is needed to address these questions.

## IMPLEMENTATION PLAN

UDOT engineers will use the data and specifications for designing and constructing high-quality, recycled, stabilized pavements.

### STATUS

New Project. A detailed work plan is being drafted. This project is part of our "Materials Research Program". A super TAC will provide oversight on this project and the others in the program. All Region Materials Engineers and Region Pavement Management Engineers will serve on the TAC.

	TASK PROGRESS		r	20	05			20	06			20	07			200	)B
NO.	TASK		Q1	Q2	Q3	04	Q1	Q2	Q3	()4	Q1	Q2	Q3	C4	Ġ1	G2	Q3
1	Evaluate the effects of different ratios of FIAP to base on material strength, durability and density	Est.															
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2	Evaluate the efficacy of specific types and amounts of different stabilizors for improving typical Utah materials	Est.	<b> </b>		-						-	-					
		Act.	<b> </b>	ļ	-	-	<b> </b>	-	-	-	<del> </del>	-	-		-		
. 3	Develop specifications regarding construction methods and early trafficking and curing issues	Est.	<u> </u>	_	ļ		ļ		<u> </u>	ļ	_	<u> </u>	ļ	-	-		
	and raying toward	Act.	<u> </u>		ļ		<u> </u>	ļ	<u> </u>	ļ		ļ			ļ		
4	Recommend procedures for designing recycled layers	Est.	<u> </u>		<u></u>	ļ	<u> </u>			ļ	<u> </u>	ļ	ļ	ļ	<u> </u>	ļ	
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	Address the challenge of measuring density in the field	Est.									_	ļ					
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***************************************	Address field construction patterns and variability of material in specification re	Est.															
6		Act					L		_						_		<u> </u>
	Address mix design/lab procedures	Est					L	_			L						<u></u>
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Fitle		Rappidmapper New	/ Initiative
Fund, Source	SPR	Project Type	Utility
Charge ID	81SR0516	Performing Org.	UDOT
PIC		Contract No.	NA NA
Project Mgr.	Hsiao	Contract Start Date	5/1/2005
Princ. Inv.	Sean Fernandez	Contract End Date	7/31/2005
	4.0	FISCAL	
Contract Amt.	N/A	Contract Cost to Complete	N/A
Contract Costs to Date	\$15,000	Project Cost to Complete	\$15,000

Evaluate RappidMapper technique and compare the results with traditional survey method. Possible application to railroad crossing with SR-201.

## IMPLEMENTATION PLAN

If the results is acceptable, Research will promote the product to all future survey activity when it is feasible

# STATUS ...

Field work has started. FHWA interested in using this to record historic buildings.

	TASK PROGRES		~~~	20	05		4000 E	204	96			20	07			20	) <del>8</del>	
NO.	TASK		Q1			Q4	Q1	OZ		Q4	O1		Q3	Q4	Q1	Q2		Q4
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<b>t</b>	Evaluation Report	Act																
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		GENERAL	
Title		Monitoring Spliced Girders, Dec	ck Panel Joints & FRP Retrofit
Fund. Source	SPR	Project Type	Pavements, Materials
Charge ID	81FR0514	Performing Org.	University of Utah
PIC	UT03.503	Contract No.	04-9129
Project Mgr.	Hsiao	Contract Start Date	3/1/2004
Princ. Inv.	Pantelides	Contract End Date	6/30/2006
Security of the second		FISCAL	
Contract Amt.	\$25,000	Contract Cost to Complete	\$25,000
Contract Cost to Date	\$0	Project Cost to Complete	\$32,500
	No.	OBJECTIVE	

1. Performance of tendon losses, weep, shrinkage, splice diaphragm performance, and deck panel joints. 2. The FRP retrofit will study environmental effects on FRP composites including temperature, corrosion, humidity and aging.

# IMPLEMENTATION PLAN

No additional resources required since automated data acquisition is in place. 2. Continue data acquisition, destructive testing including strength and chemical tests. 3.
 Analyze data, compare results to design procedures.

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Computer is currently gathering data.

	TASK PROGRESS TA	22/37/20/04/16/	****		04			20		*****		20	06			200	7	
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	Collect data from 4500 SouthV-15 and State StreeV-60 bridges.	Est.																
. 1	COREC (USE ITALIA COLLEGE) I STORY COLLEGE	Act.																
2	Compare results with AASHTO and consplice software for 4500 South	Est,		_	<u> </u>	ļ					<b> </b>	<u> </u>	-					-
***************************************		Act.		<del> </del>	╀	<u> </u>	ļ		-	ļ	-	-	-		-			
3	Evaluate reduction factor for environment for FRP design for State Street.	Est.	-	-	-	┨	-			-	-	╂	-	╂				-
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4	Perform destructive tests for strength and compare with deeign values for State Street.	Act.	-	1-	1	†	T	<del> </del>	<u> </u>		1-	-	<u> </u>	<del> </del>	<b>†</b>	<b>†</b>		-
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little		Preventive Deck Joint and Surface	Treatment Strategies
Fund, Source	SPR	Project Type	Structures
Charge ID	B1FR0336	Performing Org.	BYU
PIC	AM04.001	Contract No.	04-9081
Project Mgr.	Hsiao	Contract Start Date	10/10/2003
Princ. Inv.	Guthrie	Contract End Date	8/31/2005
<b>,</b>	2.476.0	FISCAL.	
Contract Aint.	\$79,815	Contract Cost to Complete	\$74,815
Contract Cost to Date	\$5,000	Project Cost to Complete	\$97,260

identify and document the state-of-the-art in deck joint and surface treatment strategies

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- This research is requested by Dave Eixenberger. The implementation chance is really good.
   The final result will present to Dave and Boyd Wheeler's groups.
   Quarterly meetings with Dave Eixenberger and Boyd Wheeler offering implementation assistance.

# STATUS STATUS

Maybe a scan tour overlapped with Bridge Deck Strategy. "Stay-In-Place Deck Forms" has been added.

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3	Review of previous UDOT research	Act	1	<u> </u>		-	T-	T	T	T											
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Title		Bridge Deck Strate	gy	
Fund. Source	SPR	Project Type	Structures	
Charge ID	81FR0210	Performing Org.	BYU	
PIC	UT01.504	Contract No.	03-9192	
Project Mgr.	Hsiao	Contract Start Date	4/4/2003	
Princ. Inv.	Guthrie	Contract End Date	5/31/2005	
	a de la companya de	FISCAL		
Contract Amt.	\$45,362	Contract Cost to Complete	\$18,909	
Contract Cost to Date	\$26,453	Project Cost to Complete	\$24,582	
STATE OF STREET	r, which	OBJECTIVE CONTRACTOR		

Develop a protocal in the form of a manual of practice for determining whether a deck should be rehabilitated or replaced.

# IMPLEMENTATION PLAN

- 1. Structures, Dave Nazere is ready to use this manual.
- Present the manual at Nazere's staff meeting and have question and answer time for his staff.
- 3. Review the manual with Nazere quartely after it is finished.
- 4. Base on the input from Nazere's group, modify the manual as needed.

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# STATUS STATUS

Completed, included scan tour and a manual of practice.

	TASK P			20	X12.			20	03			20	X04			200	5	
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1	Roundtable with industry experts	Act.	<b>!</b>	1	1-	<b>†</b>	1-				T-	1	1	1				
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Title		Scour Countermesaure	Study Phase I
Fund. Source	SPR	Project Type	Hydraulics
Charge ID	81FR0142	Performing Org.	BYU
PIC	UT00.305	Contract No.	04-9001
Project Mgr.	Hsiao	Contract Start Date	5/19/2903
Princ. Inv.	Zundel	Contract End Date	5/31/2007
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Contract Amt.	\$34,160	Contract Cost to Complete	\$10,114
Contract Cost to Date	\$24,046	Project Cost to Complete	\$13,148

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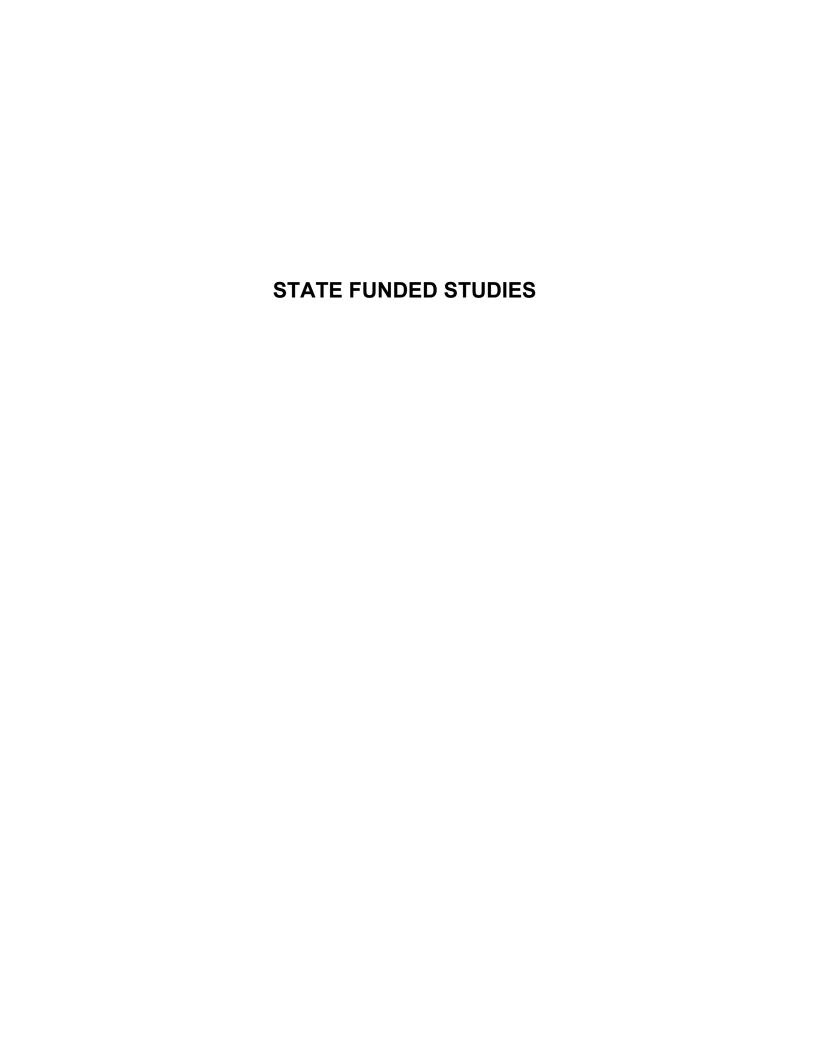
- Initiate the specs for the application of Rosgen and Rosgen type scour countermeasures.
   Evaluate the performance of Rosgen like structures in typical mountain stream reaches.
- 3. Verify that Rosgen like countermeasures can be simulated using numerical modeling by apply the Surface water Modeling System software package.

## IMPLEMENTATION PLAN

Conduct quarity TAC progress meeting. Hydraulic is ready to implement as soon as the result is obtained.

Completed. Hydraulics now has a tool for surface water models scour counter measures.

	TASK PROGRES				02			20	03			20				200	
NO.	TASK		Q1	Q2	C3	Q4	Q1		QЗ	Q4	Q1	035	Q3	C/4	Q1	Q2 (	13
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1	Review current Rosgen practice	Act.		<u> </u>													
		Est				<b></b>	-								<b></b>		
. 2	Select existing installations	Act.		1													
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3	Construct numerical models in SMS	Act															
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4	Select critera; b Design specs and guidelines	Act.									<u> </u>						
	Develop draft recommendations	Est.										r					
5	Develop drait recommendations	Act													L		
^	Submit a complete report	Est							_				1				
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7	(Possible future tasks pending Alaska's involvement	Est		_		ļ	1	_	1		_	_	_	_	_		
,	decision. Possibly 2nd quarter of 2006.)	Act		_		_	_		_	_	_	<u> </u>	ļ		_		
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Title		Adaptive Signal Control Implementation &	& Evaluation - MPC FY05
[∞] und. Source	State	Project Type	Traffic & Salety
Charge ID	81SR0510	Performing Org.	University of Utah
РIC	MPC05.001	Contract No.	05-9116
Project Mgr.	Lindsey	Contract Start Date	11/1/2004
Princ. Inv.	Martin	Contract End Date	12/31/2005
		FISCAL	图 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Contract Arnt.	\$100,000	Contract Cost to Complete	\$100,000
Contract Cost to Date	\$0	Project Cost to Complete	\$130,000
		OBJECTIVE	
		3. (2005)	

# STATUS STATUS

## project is on schedule

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NO.	TASK		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	01	Q2	Q3	04	Q1	Q2	Q3
1	Meet with Tac define criteria	Est								*****	<b>_</b>						
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2	Design an ATCS evaluation.	Est.			<u> </u>						<u> </u>						
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3	Detail evaluation of design	Est.	<u> </u>			ļ					ļ	ļ	ļ				
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4	Collect data before the ATCS	Est.	<u> </u>	ļ		ļ	<u> </u>				<b> </b>	_	<u> </u>		L		
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5	Turn on the system	Est.				<u> </u>	<u></u>				_				ļ		
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6	Collect data after the ATCS	Est.	ļ				<u> </u>	<u> </u>						ļ	<u> </u>		
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7	Observe and survey the T2	Est		<u> </u>		<u> </u>	<u> </u>	<u> </u>		<u> </u>	<u> </u>				<u> </u>		
		Act.															
8	Analyze data and produce results	Est.															
		Act.															
9	Meet with TAC and present findings	Est.															
		Act.								Contratation							
10	Deliver raport	Est.															
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Title Effectiveness of HOV Lanes, Ph. 3 - MF Fund. Source State Project Type Charge ID Performing Org.  PIC MPC05.002 Contract No.  Project Mgr. Lindsey Contract Start Date Princ. Inv. Martin Contract End Date  FISCAL: Contract Arnt. \$100,000 Contract Cost to Complete	Traffic & Safety University of Utah 05-9116
Fund. Source  State  Project Type  Charge ID  Performing Org.  PIC  MPC05.002  Contract No.  Project Mgr.  Lindsey  Contract Start Date  Princ. Inv.  Martin  Contract End Date  FISCAL  Contract Amt.  \$100,000  Contract Cost to Complete	Traffic & Safety University of Utah 05-9116
Charge ID Performing Org.  PIC MPC05.002 Contract No.  Project Mgr. Lindsey Contract Start Date  Princ. Inv. Martin Contract End Date  FISCAL  Contract Amt. \$100,000 Contract Cost to Complete	University of Utah 05-9116
PIC MPC05.002 Contract No. Project Mgr. Lindsey Contract Start Date Princ. Inv. Martin Contract End Date  FISCAL Contract Amt. \$100,000 Contract Cost to Complete	05-9116
Project Mgr. Lindsey Contract Start Date  Princ. Inv. Martin Contract End Date  FISCAL  Contract Amt. \$100,000 Contract Cost to Complete	
Princ. Inv. Martin Contract End Date  FISCAL  Contract Amt. \$100,000 Contract Cost to Complete	
FISCAL Contract Amt. \$100,000 Contract Cost to Complete	11/1/2004
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Title		Advanced Traveller Information System	ns ATIS - MPC FY05
Fund. Source	State	Project Type	Traffic & Safety
Charge ID	RDS0508H	Performing Org.	University of Utah
PIC	MPC05.003	Contract No.	05-9116
Project Mgr.	Lindsey	Contract Start Date	11/1/2004
Princ. Inv.	Martin	Contract End Date	12/31/2005
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Contract Amt.	\$100,000	Contract Cost to Complete	\$100,000
Contract Cost to Date	\$0	Project Cost to Complete	\$130,000

# IMPLEMENTATION PLAN

# STATUS STATUS

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Title		Utah Intersection 5	Safety - MPC FY05
Fund. Source	State	Project Type	Traffic & Salety
Charge ID	81SR0510	Performing Org.	University of Utah
PIG	MPC05.004	Contract No.	05-9116
Project Mgr.	Lindsey	Contract Start Date	11/1/2004
Princ. Inv.	Martin	Contract End Date	12/31/2005
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Contract Amt.	\$100,000	Contract Cost to Complete	\$100,000
Contract Cost to Date	\$O	Project Cost to Complete	\$130,000

# IMPLEMENTATION PLAN

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Fund, Source Charge ID	81SR0359	Project Type Performing Org.		~~~			<u>-</u>		Pave State			 hv					
PIC	UT02.403A	Contract No.		••••••					04-9	*****	*****	• • • • • • • • • • • • • • • • • • • •	•••••	••••			
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Princ. knv.	Cheng	Contract End Date			~~~~				12/31	····	····					<del></del>	
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Contract Arnt.	\$85,650	Contract Cost to Complete			نسنن				\$21	•••••			2000		22655	\$0000000	
Contract Cost to Date	\$64,134	Project Cost to Complete							\$27	971							
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Title		Smart PDA-Van inst	rumentation
Fund. Source	RDS0408H	Project Type	Pavement
Charge ID	815R0360	Performing Org.	Samsung
PIC	UT02.403B	Contract No.	03-9189
Project Mgr.	Anderson	Contract Start Date	4/1/2003
Princ. Inv.	Dennis	Contract End Date	12/31/2004
7-17 April 124		FISCAL	
Contract Amt.	\$39,335	Contract Cost to Complete	\$10,500
Contract Cost to Date	\$28,835	Project Cost to Complete	\$13,650
	Contract to the second	OBJECTIVE	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s

Concluct pavement distress surveys on the fly at highway speeds. This wift improve the efficiency and safety of the operation. The vari will allow a 100% sample in the outside lane; an improvement over the 10% sample. The data gathered will also be objective data as opposed to the subjective data now gathered by region staff.

## IMPLEMENTATION PLAN

1- Test the van this winter for accuracy and repeatability. 2- Complete software enhancements where needed. 3- Begin surveying the highway system this summer. 4- Conduct a full analysis of the gathered system-wide data for accuracy.

### STATUS

Underway. The system is in the calibration stage. A new camera has been purchased and will be installed by June. We plan to evaluate 200 to 400 miles of pavement this summer. The accuracy, repeatability and reliability of the system will be evaluated. Minor modifications will be completed as needed.

	TASK PROGRESS TABLE	an est	×		02				<del></del>		-		04			2005	
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2	Test the van in the field	Est	<b> </b>	_	-	-		_	-	-	ļ	<b> </b>				4	4
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3	Make modifications	Act	<del> </del>	-	-	_	-	<del> </del>	-	-	-	-	-		-	+	-
4	Monitor the van during the surveying	Est.														1	1
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STREETS CONTRACTOR		GENERAL **	
Title	Safety Benefits of UDOT Highway Prog	ram (aka) Animal Vehicle Accident An Domestic Animal Sat	ialysis (aka) Data Mining Program for Deer Fence Safety Analysis and fety Analysis
Fund. Source	State	Project Type	Safety
Charge ID	81SR0362	Performing Org.	University of Utah
PIC	E00.60MA	Contract No.	03-9178
Project Mgr.	Anderson	Contract Start Date	4/1/2003
Princ. Inv.	Perrin	Contract End Date	7/1/2005
Contract Contract		FISCAL"	And the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s
Contract Amt.	\$69,290	Contract Cost to Complete	\$36,300
Contract Cost to Date	\$32,990	Project Cost to Complete	\$47,190
10.00		OBJECTIVE	

The safety benefits of various types of STIP projects were estimated, including reconstruction, rehabilitation, safety spot improvements, etc.

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## IMPLEMENTATION PLAN

1- Twenty-nine wild animal and eight domestic animal hot spots were identified. 2- Three presentation have been given to promote the need to correct these problems. 3- Region personnel, Central Maintenance, and Traffic & Safety personnel have been involved in the initiative to recommend stratgies for correction. 4- Funding will be obtained where possible to correct these problems.

## STATUS STATUS

Underway. A report has been written describing the safety benefits. Additional safety improvement, spot improvements will be added to the analysis to give a better measure of the benefits of those projects.

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Fund. Source	RDS0408H	Project Type					•••••		Pave	emes	rt		•••••				
Charge ID PIC	81SR0359	Performing Org.						Utat	State	. Uni	ivers	ity					
	UT02.403A	Contract No.			•••••				04-	903	9						
Project Mgr.	Anderson	Contract Start Date				*****				200	·						
Princ. Inv.	Cheng	Contract End Date				******			12/3	*****	*****				****	*****	
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Contract Amt.	\$85,650	Contract Cost to Complete				~	•••••			1,518	·						
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Smart PDA-Vari Instrumentation											
RDS0408H	Project Type	Pavement									
81SF10360	Performing Org.	Samsung									
UT02.4038	Contract No.	03-9189									
Anderson	Contract Start Date	4/1/2003									
Dennis	Contract End Date	12/31/2004									
	FISCAL	The second of th									
\$39,335	Contract Cost to Complete	\$10,500									
\$28,835	Project Cost to Complete	\$13,650									
	81SR0360 UT02,403B Anderson Dennis \$39,335	81SR0360 Performing Org. UT02.4038 Contract No. Anderson Contract Start Date Dennis Contract End Date FISCAL \$39,335 Contract Cost to Complete									

Conduct pavement distress surveys on the fly at highway speeds. This will improve the efficiency and safety of the operation. The van will allow a 100% sample in the outside lane; an improvement over the 10% sample. The data gathered will also be objective data as opposed to the subjective data now gathered by region staff.

IMPLEMENTATION PLAN

1- Test the van this winter for accuracy and repeatability. 2- Complete software enhancements where needed. 3- Begin surveying the highway system this summer. 4- Conduct a full analysis of the gathered system-wide data for accuracy.

STATUS STATUS

Underway. The system is in the calibration stage. A new camera has been purchased and will be installed by June. We plan to evaluate 200 to 400 miles of pavement this summer. The accuracy, repeatability and reliability of the system will be evaluated. Minor modifications will be completed as needed.

NO.	TASK	1			2002		. 1		20	03		1	21	104			200	5
140.	IASK		č	ii [02 0	13	04	Q1	02	Qa	To	01	102	63	04	01 6	2	03 1
1	Install the camera, computer, and software in the van	Est	T									Τ	Ī	T			T	1
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2	Test the van in the field	Est	I															
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3	Make modifications	Est	1															
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4	Monitor the van during the surveying	Ent	1								<u> </u>							
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Title	Safety Benefits of UDOT Highway Program	(aka) Animal Vehicle Accident An Domestic Animal Sal	alysis (aka) Data Mining Program for Deer Fence Safety Analysis and lety Analysis
Fund. Source	State	Project Type	Safety
Charge ID	B1SR0362	Performing Org.	University of Utah
PIC	AM03.003	Contract No.	03-9178
Project Mgr.	Anderson	Contract Start Date	4/1/2003
Princ. Inv.	Perrin	Contract End Date	7/1/2005
		FISCAL	
Contract Amt.	\$69,290	Contract Cost to Complete	\$36,300
Contract Cost to Date	\$32,990	Project Cost to Complete	\$47,190
		OBJECTIVE	

The safety heneftis of various types of STIP projects were estimated, including reconstruction, rehabilitation, safety spot improvements, etc.

# IMPLEMENTATION PLAN

1. Twenty-nine wild animal and eight domestic animal hot spots were identified. 2. Three presentation have been given to promote the need to correct these problems. 3. Region personnel, Central Maintenance, and Traffic & Safety personnel have been involved in the initiative to recommend stratgies for correction. 4. Funding will be obtained where possible to correct these problems.

## STATUS

Underway. A report has been written describing the safety benefits. Additional safety improvement, spot improvements will be added to the analysis to give a better measure of the benefits of those projects.

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1	Identify additional spot improvement projects	Act.				_											7
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2	Conduct the analysis and revise the report.	Est.	ļ	ļ							L	ļ					
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		GENERAL	
Title		Preservation	Seals
Fund, Source	State	Project Type	Pavement, Materials
Charge ID	81D00033	Performing Org.	University of Utah
PIC	UT95.102	Contract No.	03-9053
Project Mgr.	Anderson	Contract Start Date	9/1/2002
Princ. Inv.	Romero	Contract End Date	9/1/2005
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Contract Amt.	\$25,311	Contract Cost to Complete	\$0
Contract Cost to Date	\$25,311	Project Cost to Complete	\$0
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Measure the practical life of open graded surface courses and chip seals. Determine how other agencies in the country use preservation seals.

## IMPLEMENTATION PLAN

1- Recommend strategies, budgets, and policies related to preservation seals. 2- Improved designs and materials will be outlined to give longer lasting and better performing seals. 3- Changes in policies concerning both OGSCs and chip seals will be recommended.

# STATUS STATUS

Underway. The report is being written. The draft is being reviewed and the recommendation under consideration. Changes in UDOT's seal coat program will be recommended.

	TASK PROGRESS TABLE			20	02			200	)3			20	Ю4			200	5
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Title	Skid Deficiency Process (Ski	ld Index Trigger Values)	
Fund. Source		Project Type	
Charge ID		Performing Org.	UDOT QIT
PIC		Contract No.	
Project Mgr.	Doug Anderson	Contract Start Date	
Princ, Inv.		Contract End Date	
		FISCAL	
Contract Amt.	\$10,000	Contract Cost to Complete	\$10,000
Contract Costs to Date	\$0	Project Cost to Complete	\$13,000
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Identify Trigger values for pavement sections with inadequate skid index values, and implement a process to determine the best strategy for correcting the problem. Other factors will be considered including skid history, other pavement condition deficiencies, crash history, wet weather crashes, AADT, geometrics, the cause of the problem, and the urgency.

### IMPLEMENTATION PLAN

Form a QiT to represent pavement Condition Surveys, Pavement Management, Safety, Maintenance, and Asset Management. Draft a process for approval by upper management.

### STATUS

New project. The QIT has met, and agreed on a basic plan to proceed. Some information will be acquired from the data mining project "Slippery Pavement Safety Study". The basics of the process have been outlined. Details will follow.

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2	Draft a process	Est.	ļ							ļ	ļ	ļ						ļ
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3	Implement into UDOY practice	Est.	ļ	ļ	-	-		-	ļ	ļ	ļ	ļ		ļ. 	ļ			
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Princ. Inv.	Grenney	Contract End Date							2	/28/	200	5		******	~~		*********		~~~
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1	Compare NOAA website with traditional IDI Ogden and Modena areas		ļ	O1		*****	CJ4	O1	~~~	~~~~	04	6			<b>C34</b>	G1			
1	Compare NOAA website with traditional IDI		Est. Act.	O1		******	G4 -	G1	~~~	~~~~	04	8			CM	G1			
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2	Compare NOAA website with traditional IDI Ogden and Modena areas Select at least 3 locations within the state or pronounced orographic effect and test with	F design data for Salt Lake, Hill AFB, where it is known that there is a NOAA into.	Act. Est. Act.	OI.		******	G4	C1	~~~	~~~~	24	GI	<b>6</b> 2			G1			
2	Compare NOAA website with traditional IDi Ogden and Modena areas  Select at least 3 locations within the state of pronounced orographic effect and test with	F design data for Salt Lake, Hill AFB, where it is known that there is a NOAA info.	Act. Est. Act.	O1		******	04	C1	~~~	~~~~	3	8				GI			
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3	Compare NOAA website with traditional IDI Ogden and Modena areas  Select at least 3 locations within the state a pronounced orographic effect and test with Identify sources for the other types of data flows including precipitation, vegetation and	F design data for Salt Lake, Hill AFB, where it is known that there is a NOAA info.  commonly used for estimation peak d soils.	Act. Est. Act.	O1		******	G4	G1	~~~	~~~~	8	व	<b>6</b> 2			G1			
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3	Compare NOAA website with traditional IDI Ogden and Modena areas  Select at least 3 locations within the state a pronounced orographic effect and test with Identify sources for the other types of data flows including precipitation, vegetation and	F design data for Salt Lake, Hill AFB, where it is known that there is a NOAA info.  commonly used for estimation peak d soils.	Act. Est. Act. Est. Act. Est.	01		******	GA	C1	~~~	~~~~	Q4	8	<b>6</b> 2	83		GT .			
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Title		Crash Data Delivery	Using GIS Ph. 2
Fund, Source	State	Project Type	Traffic and Satety
Charge ID	81SR0341	Performing Org.	IWORQ
PIC	UT01.402	Contract No.	03-9041
Project Mgr.	Doug Anderson	Contract Start Date	9/1/2002
Princ. Inv.	Perrett	Contract End Date	12/31/2004
# 1945 - F		FISCAL	were with the second
Contract Amt.	\$7,950	Contract Cost to Complete	\$999
Contract Cost to Date	\$6,951	Project Cost to Complete	\$1,299

Deliver crash information through a web application for use by UDOT decision-makers.

# IMPLEMENTATION PLAN

1- Train end users on how to conduct queries against the database. Fourteen training sessions have been held and numerous one on one training has been conducted. 2- Mustrate through presentations how the tool can be used to identify hot spots, make safety related decisions to reduce the problem, and measure the results over time. 3- The Data Mining Program will continue to use this tool to study specific safety issues.

# STATUS STATUS

Implementation phase--update data almanac. Contract is completed. Further work possibly via pool contract as needed.

	TASK PROC		Г	20	102			20	XX3				104			20	05
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Title		Discharge Recalcula	ations Ph. 2 (Canyons)
Fund. Source	State	Project Type	Hydraulics
Charge ID	81SR0441	Performing Org.	University of Utah
PIC	UT02.301B	Contract No.	04-9029
Project Mgr.	Hsiao	Contract Start Date	8/1/2003
Princ. Inv.	Perica	Contract End Date	9/1/2004
		FISCAL	786 - 12 - 12 - 12 - 12 - 12 - 12 - 12 - 1
Contract Amt.	\$42,500	Contract Cost to Complete	\$0
Contract Cost to Date	\$42,500	Project Cost to Complete	\$0

Estimate reliable design flood magnitudes for Weber River basin in Utah.

IMPLEMENTATION PLAN

Hydraulic group is ready to implement as soon as the research is completed.

STATUS

Developed new equations and hydraulics is using them.

***************************************	TASK PROGRESS TABLE		Γ	20	02	_		20	03			20	м			200	5
NO.	TASK		Q1		C33	Ç4	Q1		Q3	Q4	Q1	022	03	04	01	G2	23 G
1	Select study area and perform quality control of the streamflow data.	Est.															1
		Act.													_	_	_
2	Estimate regional skew.	Est.	_												_	_	
	- Silvato regional order	Act.	_								_					_	
3	Perform flood frequency analysis	Est.	_						_								_
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4	Calculate watershed characteristics that will be investigated as	Est.	1_	_	ļ		ļ	ļ	_	ļ							_
	possible predictors of T-year flows.	Act	<u></u>	_	ļ		<u></u>	<u></u>	ļ	<u></u>		L					_
5	Develop regional flood frenquency equations	Est.	_	_			ļ	<u></u>	_	<u> </u>	_						_
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6	Prepare the final report.	Est.	ļ	<u> </u>	ļ	ļ	ļ	-	1	ļ	_	ļ.,,	L.				_
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Title	Innovative Work Zone Safety Devices											
Fund. Source	State	Project Type	Traffic & Safety									
Charge ID	81SR0364	Performing Org.	Brigham Young University									
PIC	AM03.001	Contract No.	04-9156									
Project Mgr.	Leonard	Contract Start Date	9/1/03									
Princ. Inv.	Saito	Contract End Date	4/1/05									
		FISCAL										
Contract Amt.	\$67,200	Contract Cost to Complete	\$47,200									
Contract Cost to Date	\$20,000	Project Cost to Complete	\$61,360									

Evakuate and test several automated work zone devices, including the Travel Messenger System and License Plate Recognition Systems. Determine advantages, disadvantages, and effectiveness of use.

IMPLEMENTATION PLAN

Determine locations where these devices will be beneficial in reducing driver frustration and traffic delays. Get design and construction teams to use these systems if effective.

STATUS ...

Phase 1 testing complete. Phase 2 still on hold because suitable site was not identified. Phase 3 postponed due to changed conditions and unforseen costs. Decision will be made to close contract, look for projects meeting the need or rescope to include a current LTRAC construction project dealing with work zone safety devices.

	TASK PROGRESS TA	_		20	02		-	20			2004				2005			
NO.	TASK		Q1	QZ	03	C)4	Q1	022	ဃ	04	QΊ	œ	Cas	04	Q1	OZ2	G3	04
1	Ph. 1: Travel Massanger on I-80, I-15 and I-215	Est																٠
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3	Ph. 3: License plate recognition on US-6	E#4.		_		<u> </u>												L
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Title		tah Rockfall Hazard Rating System and Mai	ntenance Management Program
Fund. Source	State	Project Type	Maintenance, Geotechnical
Charge ID	81SR0291	Performing Org.	Utah State University
PIC	UT97.542	Contract No.	04-9072
Project Mgr.	Leonard/Farnsworth	Contract Start Date	1-May-01
Princ. Inv.	Pack	Contract End Date	31-May-04
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Contract Arnt.	\$40,000	Contract Cost to Complete	\$12,500
Contract Cost to Date	\$27,500	Est. Current FY Cost	SO

Establish and implement a Utah Rockfall Hazard Rating system along UDOT roadways, including the development of a database with a complete compilation of rockfall locations and parameters. Establish a system of prioritization to identify appropriate locations for mitigation efforts for rockfall slopes, and create a maintenance management program to ensure that prioritized rockfall locations recieve appropriate attention and mitigation efforts.

IMPLEMENTATION PLAN

Based on the prioritized modelal sites, begin to plan mitigation and maintenance efforts for the highest priority sites.

STATUS : X

Phase 1 Complete. Report Published; UT-03.01 "Utah Rockfall Hazards Inventory - Phase 1", Apr 02. Phase 2a Complete. Phase 2b underway. Database complete. Resolving final details of the prioritization algorithm. Contract extension will be needed.

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1	Phase II - Part 2: Complete the Utah Rockfall Inventory (189 sites)	Est.															*****
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2	Finalize the Utah Rockfall Hazard Rating System	Est															_
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5	Training Session and Final TAC Meeting	Est.			_	_	ļ				1						L
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l'itte	Experiment	al Determination of Dynamic Characteristics of	New Bridges (Forced Vibration, Phase 3)
und. Source	State	Project Type	Structures
Charge ID	81S15302	Performing Org.	Utah State University
PIC	TB00.302	Contract No.	04-9150
Project Mgr.	Leonard	Contract Start Date	1-Jan-04
Princ. Inv.	Halling	Contract End Date	30-May-05
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Contract Amt.	\$170,500	Contract Cost to Complete	\$35,500
Contract Cost to Date	\$135,000	Project Cost to Complete	\$46,150

Evaluate the dynamic properties of several existing bridge structures to secure an adequate characterization of these bridges, and to use this information to compare the design models with the actual field data to see if the bridges behave as modeled. Archive the detailed dynamic signature of new structures for use in the investigation of future deterioration or sesmic damage of the structures.

IMPLEMENTATION PLAN

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This project is one additional step toward the use of modal analysis as a non-destructive evaluation technique for post-seismic damage and long term deterioration of bridge structures. The data obtained from this study will be used to verify and develop this technique further, and provide a valuable database of information for subsequent studies.

STATUS STATUS

Testing and analysis complete. Draft report being prepared.

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NO.	TASK		Q1			04	01	QZ	Q3	04	01	C22	Q3	04	Q1	Q2	Q3	ľ
1	Bridge 1 (C-846): Field Instrumentation and Teating	Ext																-
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2	Bridge 1 (C-848); Data Analysis and FEM Modeling	Est.		L							<u> </u>							
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3	Bridge 1 (C-846); Réport Propàration	Est.		_	_	_							<u> </u>					
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4	Bridge 2: (C-814 Vine Street): Field Instrumentation and testing.	Est.	L	_	1		<u> </u>			<b>!</b>	<u> </u>	_						
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6	Bridge 2 (C-814 Vine Street): Report Preparation	Ent.	L	_	_	_	_	_					<u> </u>			_	_	
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7	Bridge 3: (NB Cherry Hill Off Flamp): Field instrumentation and Testing	Est.	1_	1			1_	_	<u> </u>	ļ			1		_	<u> </u>	_	
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8	Bridge 3: (NB Cherry Hill Off Flamp): Data Analysis and FEM Modeling	Est.	1	1		_		1	1	1	1_		L	1	_		_	
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9	Bridge 3: (NB Cherry Hill Off Ramp): Report Preparation	Est	1	_	_		<u> </u>	1	1_	1		1		1	1		_	
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Title		Advanced Traveller Information System	s ATIS - MPC FY05
Fund, Source	State	Project Type	Traffic & Safety
Charge ID	81SR0510	Performing Org.	University of Utah
PIC	MPC05.003	Contract No.	05-9116
Project Mgr.	Lindsey	Contract Start Date	11/1/2004
Princ. Inv.	Martin	Contract End Date	12/31/2005
		FISCAL	
Contract Amt.	\$100,000	Contract Cost to Complete	\$100,000
Contract Cost to Date	\$0	Project Cost to Complete	\$130,000

## IMPLEMENTATION PLAN

TOC

#### STATUS

#### Project is on schedule

	TASK PROGRE				005				06			200				200	
NO.	TASK		Q1	C22	03	04	01	Q2	CCS	O4	Ö1	02	CB3	04	01	QZ	Q3
		Est															
1	Detail Scope	Act.				<u> </u>							•				
	Design an Atis evaluation with TMT	Est.															
2	Design on Alle Gastreson, Ann 1 m.	Act.															
3	Approved of detail design	Est	_														
3	Approved to the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the st	Act.	L								L						
4	Analyze data ansi produce results	Est.	_														
		Act		_					0. 000000			J					
5	Meet with Yec and present findings	Est	_	_	_									<u> </u>			
		Act.	L	$\perp$	_				_	_					<u> </u>		L
6	Dollwer respert	Est	<u></u>	1		<u> </u>	<u> </u>		_	_	_						
		Act	_	_					ļ	_	_			ļ		L	
7		Est	1_					ļ	_		1	ļ	<u> </u>	_	_	_	
		Act				_	1_	<u> </u>		_	$oldsymbol{\perp}$			_	<u> </u>		L
8		Est		_			_	_	_					<u> </u>	_	ļ	<u></u>
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9		Est				_		_	<u> </u>		1	_	_	_	_		_
		Act	1			_	1	<u></u>	_	_	_			_	<u> </u>	<u> </u>	_
10		Est	_					_		_	_	_	_		1_	<u> </u>	<u>_</u>
10		Act									1	1			1	}	

Title		Effectiveness of HOV Lanes, F	h. 3 - MPC FY05
Fund. Source	State	Project Type	Traffic & Safety
Charge ID		Performing Org.	University of Utah
PIC	MPC05,002	Contract No.	05-9116
Project Mgr.	Lindsey	Contract Start Date	11/1/2004
Princ. Inv.	Manin	Contract End Date	12/31/2005
10 mm		FISCAL	
Contract Amt.	\$100,000	Contract Cost to Complete	\$100,000
Contract Cost to Date	\$0	Project Cost to Complete	\$130,000

#### IMPLEMENTATION PLAN

## STATUS

Project on schedule

	TASK PROG		F	20	03			20	<del>04</del>			20	05		••••••	200	) )
NO.	TASK		Q1		Q3	04	Q1	*****	Q3	Q4	Q1	C12	<b>Q3</b>	Q4	Q1	G2 (	13
4	Meet with TAC define scape	Est.															
1	onses with 1 Mo Commo accipe	Act.															
2	Design and ATCS evaluation	Est.	<u> </u>														_
~		Act.	_				*******										_
3	approval of detail evaluation design	Est		ļ	_							_					_
		Act.	<u> </u>				<u> </u>									_	
4	Collect data	Est.	ļ		_	-	ļ						<u> </u>				
		Aci.		ļ	_	ļ	<u> </u>		2 400000	( 00000	4 2000E						
5	Analyse data	Est	<u> </u>	_		<u> </u>	<u></u>	<u> </u>	ļ		<u> </u>						
-		Act.	<u> </u>			<u></u>			ļ		<u> </u>		L				
6	Meet with TAC and present finding	Est	_	_		ļ	<u> </u>	<u> </u>	<u> </u>	ļ	L	<u> </u>	<u> </u>				
		Act	_	_	_		<u></u>	_	_	ļ.,	_	_	_				~~~
7	Deliver results	Est.	ļ	_		_		_	_	<u> </u>	_	1_	_				
		Act.	_		_		L	_	<u> </u>	<u>_</u>	Ļ		_				
8		Est.			_	ļ	<u> </u>	_	_	<u></u>	_	_	_	_	ļ		
		Act.	_		_	_	_	_	1	_	1	ļ	<u> </u>	ļ	<u> </u>		
9		Est		1_		<u></u>	ļ	ļ	ļ	<u></u>	1	_	1	ļ	<u> </u>		
***************************************		Act.	1	1		1	<u></u>	ļ		ļ	1	ļ	1	ļ			••••
10		Est.	_					1		<b>J</b>	1			<u> </u>	<b>L</b>		
tu .		Act			1		1	1							1		

Title		Utah Intersection Safety	MPC FY05
und. Source	State	Project Type	Traffic & Safety
Charge ID	81SR0510	Performing Org.	University of Utah
PIC	MPC05.004	Contract No.	05-9116
Project Mgr.	Lindsey	Contract Start Date	11/1/2004
Princ. Inv.	Martin	Contract End Date	12/31/2005
A Commence		FISCAL THE PLANTS	
Contract Amt.	\$100,000	Contract Cost to Complete	\$100,000
Contract Cost to Date	\$0	Project Cost to Complete	\$136,000
	A	OBJECTIVE NO THE LAND	

## IMPLEMENTATION PLAN

#### **STATUS**

#### Project is an schedule

				- 2	2005			20	06		ľ	20	07			20	DB.
NO.	TASK		Q:	α	2 623	Q4	01	C22	C3	Q4	01	02	Q3	Q4	Q1	02	C)3
4	identify intersection with crashes	Esi.															
1	каоноту внозмессия мыл станов	Act.															
2	Select the worst	Est															
4		Act.				_	L	_			_						
3	identify factors for further analysis	Est						_				<u> </u>	ļ				
5		Act.					<u></u>		_	_	L					ļ	_
4	Look at other records ( police etc)	Est	_			<b> </b>	1_	1	1_	1	L	1_	_	<b> </b>		ļ	<u> </u>
7		Act	L				1	_	1	1_	1	_	_	ļ.,	<u></u>		
5	Review iit	Est.				ļ	1	_	_	1	1	_	_	_	<b> </b>		_
		Act.	L				1	1	_	_	1		_	_			_
6	Review State of Practice in Utah	Est	<u> </u>			<b>!</b>	1		_	_	_		1		_	<u> </u>	ļ
		Act	1	1		L	1	_	_	_	1	_	_	_	<u> </u>	<u> </u>	ļ
7	Meet with YAC and present	Eet	_	1			<b>.</b>	1	_	1	1	_	_	ļ	<u> </u>	<u> </u>	_
		Act	1	_	_				4	_	_		1	_	_	<u> </u>	_
8	Deliver Prioritized intersection	Est	1	4		1	[			_	1	_	_	<u> </u>	<u> </u>	<u> </u>	_
		Act	1	1		4		<b>.</b>	_	_	_	4	_	1	<del> </del>	<del> </del>	ļ
9		Est	1.			4	1		1		_	4	4	4	1	<u></u>	Ļ
***************************************		Act	1	4		4	_	4	_	4	4	_	_	_	1	ļ	_
10		Est	1	1				_		_	_			_	1	1_	ļ
rw.		Act	.	Ì			1		1		1	1			I	1	

Title		Adaptive Signal Control Imple	mentation & Evaluation - MPC FY05
Fund. Source	State	Project Type	Traffic & Salety
Charge ID	81SR0510	Performing Org.	University of Utah
PIC	MPC05.001	Contract No.	05-9116
Project Mgr.	Lindsey	Contract Start Date	11/1/2004
Princ. Inv.	Martin	Contract End Date	12/31/2005
		FISCAL	Specific Committee Committee Committee Committee Committee Committee Committee Committee Committee Committee Co
Contract Amt.	\$100,000	Contract Cost to Complete	\$100,000
Contract Cost to Date	\$0	Project Cost to Complete	\$130,000
		OBJECTIVE	The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon

#### IMPLEMENTATION PLAN

## STATUS

The project is behing schedule due to the device being hit which caused the project to have more data collection time

	TASK PROGRESS	T	F ***	20				20			·	20	05			200	6
NO.	TASK		G1	Q2	<b>G3</b>	Q4	Q1	Q2	03	04	Q1	022	Q3	04	<b>G1</b>	O3 (	33
1	Most with Tac define criteria	Est.															4
*.		ACL.															
2	Design an ATCS evaluation.	Est.	<u> </u>		ļ			-									
		Act.				<b></b>			<u></u>	<u></u>			ļ			<b>-</b>	_
3	Detail evaluation of design	Est.	_	_	<u> </u>			_					ļ				_
3		Act.		_			<u> </u>										
A	Collect data before the ATCS	Est.	1_							_							
4		Act.					L	_			_						
	Turn on the system	Est											<u></u>				••••
5		Act					L										
^	Collect data after the AYCS	Est			_	_						_					
, <b>6</b>		Act					L										
7	Observe and survey the T2	Est									_						
,		Act					L				_			ļ			·····
~	Analyze datz and produce results	Est					L			_	_				L		
8		Ac												<u> </u>	_		
<i>*</i>	Meet with TAC and present findings	Es:	<u>.</u>								1						
9		Ac	L.									_			L		
	Deliver report	Es	١.								1	_					
10		Ac	T	1	1										1		ĺ

# I-15 TEST BED FUNDED STUDIES PHASES 1-4



		GENERAL	
Title		Long term structural monitoring of	of post-tensioned spliced girders and deck joints
Fund. Source	I-15 Test Bed	Project Type	Structures
Charge ID	81F155303	Performing Org.	University of Utah
PIC	TB00.303	Contract No.	02-9166
Project Mgr.	Hsiao	Contract Start Date	8/1/2001
Princ. Inv.	Pantelides	Contract End Date	6/30/2006
		FISCAL	
Contract Amt.	\$194,500	Contract Cost to Complete	\$0
Contract Costs to Date	\$194,500	Project Cost to Complete	\$0

#### **OBJECTIVE**

The primary objective of the research is to determine the long term performance of spliced prestressed girders used in R/C concrete bridges. This includes the following sub-subjectives: a) Compare the prestress losses, deflections, and creep parameters obtained from field measurements of the spliced precaset girders. b) Compare these field measurement to finite element computer programs for vertical load, fatigue load, thermal load and tendon losses. c) Developguidelines for design modifications and improvements for the future design and installation of the spliced girders, such as curing time required before post tensioning, etc.

#### IMPLEMENTATION PLAN

This is information getting research, and the

#### STATUS

Final report is done and the project is completed.

	TASK PROGRESS	TAE	BLE															
NO.	TASK				05				06			20				20		
	,,,,,,		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Evaluate concrete, steel, and post tensioning strand material properties.	Est.																ш
		Act.																
		Est.																
2	Install additional sensors and automatic data acquisition system.	Act.																
		Est.																
3	Collect field measurements from placed on selected girders and the deck	Act.																
4	Assistant all data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data and data an	Est.																
4	Analyze all data gathered during the 21 month data collection period	Act.																
5	Develop analytical models designed to predict the structural and thermal behavior	Est.																
5	of the post tensioned girders both during and after construction	Act.																
6	Perform two truck load tests during the course of 2 years	Est.																
o o	1 Choint the track load tests during the course of 2 years	Act.																
7	Develop an intrum report	Est.																
,	Soldy all main report	Act.																
8	Develop a final report intended for publication	Est.																
O	Develop a mai report increase for publication	Act.																
9		Est.																
3		Act.																
10		Est.																
10		Act.																

		GENERAL	
Title		Loading Rate Effects on F	Axial and Lateral Pile Capacity
Fund. Source	I-15 Test Bed Ph. 4	Project Type	Structural, Geotechnical
Charge ID	81F15401	Performing Org.	Brigham Young University
PIC	TB01.401	Contract No.	03-9144
Project Mgr.	Leonard	Contract Start Date	1-Oct-02
Princ. Inv.	Rollins/Jensen	Contract End Date	1-Mar-05
		FISCAL	
Contract Amt.	\$150,000	Contract Cost to Complete	\$53,700
Contract Cost to Date	\$96,300	Project Cost to Complete	\$69,810

OBJECTIVE

Dynamic loading systems, such as the Statnamic system and the CAPWAP technique are used to determine the load capacity of deep foundations without the need for conventional load frames. However, the rate of loading effects from the use of these systems are still poorly understood, particularly for fine-grained soils, thereby decreasing the reliability of these testing methods and preventing greater utilization. A series of axial load tests on pile foundations will be performed at a variety of loading rates to increase the understanding of each of the rapid/dynamic load test methods. In addition to testing steel pipe piles under various axial loading rates, a new type of reinforced concrete pile using IsoTruss meinforcement will be tested to evaluate the response of the pile to various lateral loading rates. The goal in the design and testing of the IsoTruss reinforced pile will be to match the flexural stiffness of the steel piles.

#### IMPLEMENTATION PLAN

Modify and update the techniques for load testing of steel pipe piles. Incorporate the new technique into the geotechnical and structural Manual of Procedures as an available tool.

#### STATUS

Field testing completed. Analysis and report preparation underway, and about 4 months behind schedule. Contract is being extended by about 15K and four months to expand scope take advantage of a testing opportunity on SR-201 project.

	TASK PROGRESS TAE	LE																
NO.	TASK				02				03				04				05	
NO.	TAOK		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Site Characterization, Prepare axial test pile	Est.																
		Est.																
2	Prepare lateral test piles	Act.																
3	Complete lateral load lab tests	Est.																
		Act.															_	
4	Complete field tests	Est.																
·	Complete had toda	Act.																
5	Interim Report	Est.																
	·	Act.															$\Box$	
6	Draft Final Report	Est.																
		Act.																
7	Final Report	Est.																
		Act.																
8	Statanamic testing on SR-201 at Redwood.	Est.																
Ů		Act.																
9		Est.																
		Act.																
10		Est.															$\Box$	
		Act.																

	GENERAL	
Eval	uation of Fiber Reinforced Polymer Cor	mposite Confined Rectangular Concrete Columns
I-15 Testbed	Project Type	Structures
81F15406	Performing Org.	University of Utah
TB01.406	Contract No.	03-9056
Hsiao	Contract Start Date	9/3/2002
Pantelides	Contract End Date	8/31/2005
	FISCAL	
\$161,924	Contract Cost to Complete	\$0
\$166,000	Project Cost to Complete	\$0
	I-15 Testbed 81F15406 TB01.406 Hsiao Pantelides \$161,924	Evaluation of Fiber Reinforced Polymer Cor  I-15 Testbed Project Type  81F15406 Performing Org.  TB01.406 Contract No.  Hsiao Contract Start Date  Pantelides Contract End Date  FISCAL  \$161,924 Contract Cost to Complete

#### **OBJECTIVE**

Develop design guides for fiber reinforced polymer composite retrofit of rectangular concrete columns. Specific objectives will be achieved: a) Perform full scale laboratory experiments on circular, square, and rectangular columns wrapped with composites. 2) Develop an analytical model for describing the confinement provided by the FRP composite for rectangular columns wrap. 3) Develop guidelines for design of FRP jackets for rectangular columns, and techniques for using the FRP confined concrete properties in pushover analyses of retrofitted concrete bridges.

#### IMPLEMENTATION PLAN

This project has low value for current structures application.

#### **STATUS**

All tasks are completed.

	TASK PROGRESS	TAE	BLE															
NO.	TASK				05				06				07				80	
		Est.	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Review esisting experimental results and analytical models for FRP jexketed rectangular concrete columns	Act.																П
2	Test full scale models of circular, square, and rectangular columns wrapped with FRP composites	Est.																
	with FKF composites	Act.																
3	Develop analytical models for FRP confined rectangular concrete columns.	Est.																
		Act.																
4	Verify the analytical FRP confined concrete model with finite element analyses.	Est.															<u> </u>	Ш
	ŕ	Act.																Щ
5		Est.																
		Act.																Щ
6		Est.																
		Act.																Н
7		Est.																Н
		Est.																H
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	+	Est.																H
9		Act.																
	1	Est.																П
10		Act.																П



# **INNOVATIVE BRIDGE FUNDED STUDIES**



		GENERAL	
Title		Evaluate Feasibility of us	ing MMFX rebar and HPS performance
Fund. Source	Innovative Bridge Fund	Project Type	Structures
Charge ID	5075715D	Performing Org.	Utah State University
PIC		Contract No.	Pending
Project Mgr.	Hsiao	Contract Start Date	Pending
Princ. Inv.	Barr	Contract End Date	Pending
	e he watering by	FISCAL	
Contract Amt.	pending	Contract Cost to Complete	Pending
Contract Costs to Date	pending	Project Cost to Complete	Pending
		OBJECTIV	

Evaluate MMFX rebar of its possibility to be used as UDOT standard reinforcing steel for concrete. Give recommendations to UDOT. Review high performance steel performance in design process. The advantage and disadvantage by using the full strength of the HPS ability

#### IMPLEMENTATION PLAN

Based on the recommendation, UDOT will determine the usage of the above material and application critera

#### STATUS

Contract is in progress

	TASK PROGRES	J IME		~~~~	<u> </u>			~~~	<u> </u>				<del>77</del>			~~~~	70	3, 11, 11
NO.	TASK		Q1	02	G3	Q4	Q1	02	Q3	Q4	01	G2 20	Q3	04	Q1	02	G3	Q4
1		Est										-					****	
		Act.																
2		Est.																
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3		Est			<u> </u>	<u> </u>				ļ								
		Act.			<u> </u>													
4		Est.	<u> </u>	ļ									<u> </u>					_
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Act.			<u> </u>						<u> </u>							_
5		Est.	<u></u>			ļ	<u> </u>	ļ			<u> </u>						,	
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6		Est.	<u> </u>			ļ			<u> </u>		<u> </u>	<u> </u>			L			_
~~~~~		Act.	L															
7		Est.		_														L
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8		Est				_				_								
~~~~		Act.																
9		Est									<u></u>							
·		Act.																_
10		E31.		<u> </u>		<u> </u>	<u></u>	ļ	<u></u>	1								
- **		Act																

Title		Wanshi	ip Bridge Deck Replacement
Fund, Source	Innovative Bridge	Project Type	Structures
Charge ID	81FB0901	Performing Org.	URS
PIC	1803.001	Contract No.	03-9177 .
Project Mgr.	Hsiao	Contract Start Date	2/1/2003
Princ. Inv.	Hardee	Contract End Date	6/30/2005
transfer of the second		FISCAL	
Contract Amt,	\$175,615	Contract Cost to Complete	\$28,923
Contract Cost to Date	\$146,692	Project Cost to Complete	\$37,600

1. Provide design assistance to Structures Division. 2. Provide "Lessons Learned Report after PS & E". 3. Provide "Lessons Learned Report after construction."

IMPLEMENTATION PLAN

1. Present the "Lessons Learned Report after PS & E" to the bridge design group. 2. Present "Lessons Learned Report after Construction" to the Structures and Construction staff. 3. Present overall lessons learned report at the engineering conference. 4. Meet with Structures and Construction people regularly to assure that the lessons learned have been implemented at the similar project. No same mistakes will occur.

STATUS TO THE PROPERTY OF THE

The project progress is dictated by the construction schedule. It is anticipated that the work will be done in June, 2006. Lessons Learned and manuals have been received. FHWA approved and allocated about \$10,000 for a scanning tour.

	TASK PROGE			20	02			20	03	1		- 20	M.			20	25.	- 1		200	Mi .
NO.	TASK		Q1	CIZ	CI3	04	Q1	Q2	03	124	01	Q2	CIG	Ω4	Q1	02	Q5	G4	OI I	02]	00 (
1	Attend TAC meeting	Est.																			\prod
,		Act.																			I
2	Prepare a Pretiminary Oeck	Est.																			
		Act.			ļ		-							ļ	<u></u>					_	4
3	Coach Structures during the design	Est.												ļ	_				\sqcup	_	\perp
		Act.	-				.							ļ.,	<u>_</u>					_	
4	Review PS & E Quality	Est.			-	-						ļ	ļ	-	_						_
		Act.	┼	-	-		_	-		-	ļ		_	—	┸	-			-	-	-
5	Collect Lessons Learned Documents	Est.	-					-			-		-	┼	╂	╂					+
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6	Present Lessons Learned after PS & E	Act	╁┈	-	┼	┼	-	╁	-	H	ļ		┼-	╁╌	╁	┼				-	+
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7	Coach Construction during construction	Act.	 	 	†	 	†	1-	†	1-	h		1	1	t	t	T		1		7
		Est.	†	†	†	1	1	1	1	1		T	T	T	T						1
8	Collect Lessons Learned Documents	Aci	1	1					<u> </u>	T			T	1			F	-			
9	Prepare and present lessons learned report after the construction	Est.	Γ		Ι				Γ	I	Γ	Γ	Γ	1	T		Π				
	Property and present resource regarded report area are CONSTRUMN	A61.																			
10	Possible follow-up evaluation	F.st.				_	L														
		Act	<u></u>	<u></u>	<u></u>	<u>_</u>	<u></u>	ļ	ļ_	_	_	_	L	L	_		<u></u>	_			
11	Scanning tour	Est.	_	_	_	1_	L.	1	1	1	<u></u>	<u></u>	1	1	1	1		_			
		Act	1		1	1		1			į	1		1		1		1			. [

Title	3	760 S. and 3900 S. on I-215 Bridge	Replacement by Prefabricated Elements
Fund. Source	Innovative Bridge	Project Type	Structures
Charge ID	81FB0851	Performing Org.	MD ²
PIC	IB04.001	Contract No.	04-9103
Project Mgr.	Hsiao	Contract Start Date	1/1/2003
Princ. Inv.	Dye	Contract End Date	7/1/2006
	tora surantani	FISCAL	
Contract Amt.	\$34,800	Contract Cost to Complete	\$12,750
Contract Cost to Date	\$22,050	Project Cost to Complete	\$16,575

OBJECTIVE OBJECTIVE

Provide "lessons learned report after construction" for structures and construction engineers and technicians,

IMPLEMENTATION PLAN

Present "Lessons Learned Report after Construction" to the Structures and Construction engineers.
 Present a modified report to the construction technicians.
 Present the report to the Engineering conference.
 Visit construction and structures engineers regularly to assure that the lessons learned have been implemented.

STATUS

The state of the s

The project progress is dictated by the construction schedule. It is anticipated that the Lessons Learned report will be done in July, 2005. Deliverable to Structures & Regions.

NO.	TASK		L		102				03				04				05
	7 74471		01	CO2	03	04	01	C22	Q3	O4	01	Cl2	03	Q4	01	Ω2	Q3
1	Develop the plan, task 1-3	Est.	ļ												ļ		
*************		Act.									L		<u> </u>				
2	Collect construction documents for lessons learned report, task 4-	Est.															
	12	Act.			<u> </u>												
3	Attend TAC meetings, task 13	Est.												14			
~~~~		Act.															
4	Site inspection after construction, task 14	Est.															
		Act.															
5	Attend PS & E meeting, task 15	Est.															
-		Act.								i i							
6	Prepare lessons learned report after the construction, task 16-18	Est.															
	- 147-10-10-10-10-10-10-10-10-10-10-10-10-10-	Aert.										26					
7	Present lessons learned report after construction, task 19-21, and	Est.															
	plant visit	Act.	L	L		_	_				L	L					
8		Est.															
-		Act.															
9		Est.															
		Act.															
10		Ézt.															
		Act.	T	T	T	T	T	T	T	T	T	T	T	T	1	1	

	Stainless Clad Re	bar Study
Innovative Bridge	Project Type	Structures
81FB0676	Performing Org.	Earth Tech
IB02.001	Contract No.	02-9195
Daniel Hsiao	Contract Start Date	7/1/2001
Carter	Contract End Date	12/31/2006
	FISCAL	
\$77,260	Contract Cost to Complete	\$4,920
\$72,340	Project Cost to Complete	\$6,396
	81FB0676 IB02.001 Daniel Hsiao Carter \$77,260	Innovative Bridge Project Type  81FB0676 Performing Org.  IB02.001 Contract No.  Daniel Hsiao Contract Start Date  Carter Contract End Date  FISCAL  \$77,260 Contract Cost to Complete

Assess the potential cost savings resulting from using stainless clad rebar.

#### IMPLEMENTATION PLAN

Will present the findings at Boyd Wheeler's staff meeting. If the finding is positive, research will help Structures in specs developing and apply the new material to other projects. Find out the cost savings to the Department.

#### STATUS STATUS

In progress. However, because of the stainless clad rebar manufacturer did not deliver on time for the construction season, the objective can not be reached. Since no field installation, structures will spend the remaining funds used to visit the North Carolina Plant.

NO.	TASK				200	2			20	03	-		20	04			20	05
140.	JASA		Q1	To	2	Q3	04	Q1	02	QЗ	Q4	Q1	022		04	01		
1	Literature and phone survey	Est.	L		4													
-		Act.		Ŀ														Ĺ
2	Modifications to bridge construction bid documents	Est.		1														L
		Act.																
3	Detailed evaluation and instrumentation plan	Est.		L	1													
		Ac1.																
4	Interim report	Est.	L	_														
	,	Act.	L									<u> </u>						
5	Installation of corrosion monitoring system	Est.																
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6	Assessment of constructability issues	Est.		_														
		Act.	L									L						
7	Final report	Est.	<u> </u>	<u>.</u>				<u> </u>							×.	*		
	·	Act.	L	_			L	L					Ŀ					
8	Scanning tour																	1
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9		L																
-																		
10		Est.																
10		Act.	T	T			[I	<u> </u>	T	T	T	T	T			T	Γ

POOLED FUND LEAD STATE STUDIES



Title		Pavement Marking Life C	ycle, Ph. 2
Fund. Source	SPR	Project Type	Traffic & Safety, Maintenance
Charge ID	4001808H	Performing Org.	BC Traffic
PIC	PL02.094	Contract No.	03-9184
Project Mgr.	Berg	Contract Start Date	9/1/2002
Princ. Inv.	Beck	Contract End Date	6/30/2006
	355	FISCAL	
Contract Amt.	\$319,944	Contract Cost to Complete	\$265,246
Contract Cost to Date	\$54,698	Project Cost to Complete	\$344,820

Develop life cycle curves for methylmethacrylate, thermoplastic, tape, and epoxy pavement markings based on AADY, pavement type and winter maintenance.

IMPLEMENTATION PLAN

Curves will be used to predict location specific performance of selected pavement markings that will contribute to BMP for pavement marking programs.

STATUS

First three years of data has been collected and evaluated. Data collection continues this year. Because of personnel changes with Texas Transportation Institute, data evaluation and presentation is behind schedule. The contractor is working with them to get back on schedule.

	TASK PROGRESS		MACHINETIC .		002		ľ		03	*****			04		075	200	
NO.	TASK		Q1		03	04	Gī			G4	01		Q3	GA	Q1	G2]	Q4
1	Collect 2002 Date	Fot.															
		Act				L					L						
2	Evalueta ansi present 2002 Data	Est.				ļ							ļ		ļ		
·*************************************	***************************************	Act.	<u> </u>	<u> </u>	ļ	<u> </u>											
3	Collect 2003 Date	Est.		<u> </u>	ļ	 	<u> </u>	<u> </u>		1	_		_				 L
		Act.	_	_	1	_	_				L.,	_			_		 L
4	Evaluate and present 2003 Date	Est.	<u></u>	L	_	L				<u> </u>					<u> </u>		 L
		Act.		_		_	<u></u>										 L
5	Collect 2904 Data	Est	<u> </u>	ļ	1_	<u> </u>	_	L	_	_	<u> </u>			Ŀ			 L
		Act		ļ	<u> </u>	<u> </u>	<u> </u>		_		L				L		 _
6	Evaluate and present 2004 Data	Est.	<u> </u>	_	1	<u> </u>		<u> </u>	ļ	<u> </u>	L	_					 _
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7	Collect 2005 Date	Est.	ļ	_	_	_	<u> </u>	ļ	_	ļ	<u> </u>	ļ	ļ	<u> </u>	L		L
		Act	L	_		_	<u></u>			<u> </u>	<u></u>		_				 Ļ
8	Evakusto and present 2005 Date	Est.		_	_	_			<u></u>	<u> </u>	<u></u>	<u> </u>	_	<u> </u>			 L
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9	Fixed report and recommendations	Est.	_		_			_	_	_							1
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		Acrt.										1					ľ

		GENERAL	
Title			WASHTO-X
Fund. Source	SPR	Project Type	Technology Transfer
Charge ID	4002108H	Performing Org.	USU
PIC		Contract No.	'02-4302 TPF-5(017)
Project Mgr.	Doug Anderson	Contract Start Date	
Princ, Inv.	Bolling	Contract End Date	
		FISCAL 1	
Contract Amt.		Contract Cost to Complete	\$0
Contract Costs to Date	\$0	Project Cost to Complete	\$0
	fig. for the	OBJECTIVE	The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon

Conduct technology transfer sessions on technical and administrative transportation issues. Fourteen of the WASHTO States have agreed to participate and contributed funding through a pooled-fund project.

#### IMPLEMENTATION PLAN

1- Conduct sessions on pressing issues that are proposed by the state agencies. 2- Measure the benefits through feedback surveys. 3- The program has been proposed for continuance for another two years. The program can be maintained at a lower cost than it took to create it and role it out. 4- Present the lessons learned from the program to other regions in the country.

#### STATUS

Underway. A final report has been written and distrituted describing the program benefits. It has been determined that 34% of the participants have changed the way they do business as a result of attending the session. More than 90% will attend another session. A second two-year program of sessions has been planned.

NO.	TASK P			20	03			20	04		r	21	05			20	
NO.	TASK		Q1	Q2		Q4	Q1	Q2		Q4	aı	Taz	03	Q4	01	Q2	
1	Present findings from the first two years.	Est															
*************************		Act.															
2	Begin the second series of sessions	Est.							2								
·····		Act.									<u> </u>	_					
3		Est															
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4		Est.															
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I-15 TEST BED FUNDED STUDIES PHASES 1-4



Title	Non-Destruc	tive Evaluation Method to Determine F	Residual Tendon Stress in Pre-Stressed Girders
Fund, Source	I-15 Test Bed Ph. 4	Project Type	Structures
Charge ID	81FR0404	Performing Org.	Utah State University
PIC	TB01.404	Contract No.	05-9040
Project Mgr.	Leonard	Contract Start Date	1-Jun-04
Princ. Inv.	Paul Barr	Contract End Date	30-Jun-08
		FISCAL	are trouble state of the
Contract Amt.	\$173,285	Contract Cost to Complete	\$138,285
Contract Cost to Date	\$35,000	Project Cost to Complete	\$179,771

Investigate the feasibility and effectiveness of non destructively determining the residual force in tendons of pre stressed girders by isolating, but not removing, a small block on the tensile face of the girder.

IMPLEMENTATION PLAN

If the method is successful, UDOT bridge inspection and rating procedures to incorporate this new technique.

STATUS STATUS

Laboratory set-up and literature search underway. Fabrication of concrete cylinders in progress.

210	****			20	05			20	06			200	37			200	80
NO.	TASK		Q1			Q4	Q1			Q4	Q1	COS		04	Q1	02	Q3
1	Literaturo Search	Est.															
•		Act.															
2	Laboratory Testing Preparation / Compression Testing	Est.															
***************************************		Act.															
3	Fireto Element Madelling of Cylinders	Est.															
		Act.		_						<u> </u>	L						
4/5	Laboratory Testing of Cylinders / Date Analysis	Est.	_	_		L											
~~~~~		Act.		_	<u> </u>				<u></u>	<u> </u>	L		<u></u>				
6	Laboratory Prep for Model Beam Tests	Est.	1	1				_	<u> </u>	L	<u> </u>						
-		Act.	1	1_	<u></u>	_		L	<u></u>	L	<u></u>	ļ					
7	Finite Element Modeling of Model Pre-Stressed Beams	Est.	1	_	ļ			<b> </b>	<u> </u>	_	<b> </b>						ļ
~~~~		Act.	1	_	<u></u>	<u></u>	<u> </u>		_		Ļ	<u> </u>					
8/9/10	Model Beam Fabrication / Testing / Data Analysis / Interim Report	Est	1_	ļ	ļ	ļ			<u> </u>		<u> </u>	<u> </u>	ļ				
		Act.	1	1	_	_	_	_	_		_						
12	Finite Eloment Medating of Girdors	Est	1_	<u> </u>	<u> </u>	ļ	_		1	!	ļ_	_					_
***************************************		Act	1			<u></u>	_	_	_	<u> </u>	1						ļ
11 / 13 / 14	Full Scale Teal Preparation / Girder Testing / Data Analysis	Est	1	1	_	ļ	ļ	_	_		L						
		Act	1_	1			<u></u>	Ļ	1	_	ļ	ļ					_
15	Final Report	Est	1	<u> </u>		ļ	<u>.</u>	_	ļ		1						
		Act	.]				1		1		1	1					

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Title	EXPRE	nusi Lesitti Montoling ot Mem i	15 Structures (Forced Vibration, Phase 4)
Fund, Source	I-15 Test Bed Ph. 4	Project Type	Structures
Charge ID	81FR0406	Performing Org.	Utah State University
PIC	TB01.405	Contract No.	pending
Project Mgr.	Leonard	Contract Start Date	5/1/05
Princ. Inv.	Halling	Contract End Date	12/31/07
19.44 (BLGC) 1990		FISCAL	
Contract Amt.	\$144,440	Contract Cost to Complete	\$144,440
Contract Cost to Date	\$0	Project Cost to Complete	\$195,000
	Andrew Commission Commission (Co.)	OBJECTIVE	

Install, establish and maintain a web-based reaf-time vibration monitoring system for the strong-motion array that has been installed on bridge C-846 at the I-80/I-15/SR-201 interchange in Salt Lake County, and demonstrate the accessibility and application of this technology for bridge monitoring and design.

IMPLEMENTATION PLAN

7 (1996) 5 (5) (4) (4)

Once completed, a permanent, real-time monitoring system will be in place for this location. UDOT will continue to monitor this structure. Comparing measured model frequencies with design forces, future bridges will be able to be designed more accurately. Implementation of this monitoring scheme at other bridges will be recommended based on lessons learned here.

STATUS STATUS

Equipment design underway. Installation expected.

NO.	TASK PRO TASK			20	Ю4		L	20	106		L	20	106			20	07
***************************************	T 79971		01	022	03	Q4	Q1	·		04	01	022	œ	8	Q1	CI2	03
1	Purchase and install equipment.	EM.	<u> </u>								<u> </u>						
		Act.								<u> </u>							
2	Operational testing	Est.															
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Act.															
3	interim presentation	Est.															
		Act.		L	_		_			L		L					
4	Develop analysis models	Est.	_		_		<u> </u>	_	_	_	_						
		Act.	L	_				_	_	_	L		_				
5	Draft littal report	Est.	L		_	_	<u> </u>	_	_		L	_	_				
_	·	Act.						_	_		L		L				
6	Fireal report	Est.	<u> </u>	_	<u> </u>		<u> </u>	<u></u>	_	_	L	_					
		Act.	L			_	_				_	_					_
7		Est.		<u> </u>			_	_	1_	_	<u> </u>		<u> </u>				L
		Act.	_	L		<u> </u>	<u></u>	<u></u>	_		L			_			L
8		Est.					_	<u> </u>	_	_	_	_	_				L
***************************************		Act.	_	_		_	_	<u></u>	1		_	_	_				
9		Est.					_		_		_						
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10		Act	T	T-	1	1	-	1	[1		T	1	T	T		Γ

Title	Evaluation	on of Fiber Reinforced Polymer	Composite Confined Rectangular Concrete Columns
und. Source	I-15 Testbed	Project Type	Structures
Charge ID	81F15406	Performing Org.	University of Utah
PIC	TB01.406	Contract No.	03-9056
Project Mgr.	Hslao	Contract Start Date	9/3/2002
Princ. Inv.	Pantelides	Contract End Date	8/31/2005
		FISCAL	
Contract Amt.	\$161,924	Contract Cost to Complete	\$0
Contract Costs to Date	\$166,000	Project Cost to Complete	\$0

Develop design guides for fiber reinforced polymer composite retrofit of rectangular concrete columns. Specific objectives will be achieved; a) Perform full scale laboratory experiments on circular, square, and rectangular columns wrapped with composites. 2) Develop an analytical model for describing the confinement provided by the FRP composite for rectangular columns wrap. 3) Develop guidelines for design of FRP jackets for rectangular columns, and techniques for using the FRP confined concrete properties in pushover analyses of retrofitted concrete bridges.

IMPLEMENTATION PLAN

This project has low value for current structures application.

STATUS : -- 41

All tasks are completed.

	TASK PROGRESS				05				06				07			200		
NO.	TASK		Q1			04	G1		G3	04	Q1		Q3	04	Q1			04
1	Review esisting experimental results and analytical models for FRP jexketed	Est.																
	rectangular concrete columns	Act.																
2	Test full scale models of circular, square, and rectangular columns wrapped with FRP composites	Est.	-		-	-			ļ									_
		Est.	-		 	┼		 	-	 	┼		-				*****	├-
3	Develop analytical models for FRP confined rectangular concrete columns.	Act.	 		 	+	-	 	-	 	 	-	-	 				-
	Verify the analytical FRIP confined concrete model with finite element	Est.			 	†	 	 	†	<u> </u>	T	•	 		-		-	-
4	analyses.	Act.																
5		Est.																
***************************************		Act.																
6		E51.			_		<u> </u>											
		Act	<u> </u>				L				L							_
7		Est.	_		_	ļ	ļ	ļ	<u> </u>		_				L			1
-		Act.	<u> </u>	<u></u>			<u> </u>							<u> </u>			L	1
8		Est.	ļ	ļ	ļ	ļ	<u> </u>	<u> </u>		ļ		<u> </u>		<u> </u>				1
		Act.	<u> </u>	<u> </u>							<u></u>	<u> </u>		<u> </u>	<u> </u>			1
9		Est	ļ	ļ	<u> </u>	_	<u> </u>		ļ	_	_							1
		Act.	ļ	ļ	<u> </u>	ļ	ļ	ļ	ļ	_	<u> </u>				<u> </u>			1
10		Est.	ļ	<u> </u>		_	_			_	<u> </u>	<u> </u>	-	<u> </u>	<u> </u>			+
		Act.									1				1			1

Title		Long term structural monitoring of post-tension	ned spliced girders and deck joints
Fund. Source	I-15 Test Bed	Project Type	Structures
Charge ID	81F155303	Performing Org.	University of Utah
PIC PIC	TB00.303	Contract No.	02-9166
Project Mgr.	Hsiao	Contract Start Date	8/1/2001
⊃rinc. Inv.	Pantelides	Contract End Date	6/30/2006
40.0	200	FISCAL.	KW LESSEN AND THE STATE OF THE
Contract Amt.	\$194,500	Contract Cost to Complete	\$0
Contract Costs to Date	\$194,500	Project Cost to Complete	\$0

The primary objective of the research is to determine the long term performance of spliced prestressed girders used in R/C concrete bridges. This includes the following sub-subjectives: a) Compare the prestress losses, deflections, and creep parameters obtained from field measurements of the spliced precaset girders. b) Compare these field measurement to finite element computer programs for vertical load, fatigue load, thermal load and tendon losses. c) Developguidelines for design modifications and improvements for the future design and installation of the spliced girders, such as curing time required before post tensioning, etc.

IMPLEMENTATION PLAN

This is information getting research, and the

STATUS

Final report is done and the project is completed.

	TASK PROGRESS	TAE	LE				<u>, 10</u>			V. (4				£) (*)				
NO.	TASK			*****	05		ļ	نسسن	06			····	07	ليب		20		لسينو
	Evaluate concrete, steel, and post tensioning strand material properties.	Est.	01	1,02	Q3	04	01	CJ2	us	U4	<u> </u>	Q2	us	U4	31	G2	Q3	124
1	Evaluate contraste, steet, and post tensioning search material properties.	Act.																
2	Install additional sensors and automatic data acquisition system.	Est.	 	ļ		ļ		ļ			ļ	ļ						-
***************************************		Act.	<u> </u>	ļ	ļ	ļ	ļ	ļ		ļ	 	-	<u></u>	ļ				-
3	Collect field measurements from placed on selected girders and the deck	Est.	-	 	╂		┞	-			 	-	-		-		-	╂
 		Act.	╀	┿	┼	┈	├-	╂	-	<u> </u>	├	╀	-	-	-	-		┿
4	Analyze all data gathered during the 21 month data collection period	Est	 	╁┈	╂	╂	-	┼	 	-	╂	-	-			-	-	┿
***************************************		Act.	┼	┼	┿	┿	╀	 	┿	-	╂	-	┼	-	-		 	╁┈
5	Develop analytical models designed to predict the structural and thermal behavior of the post tensioned girders both during and after construction	Est.	╂	┼	┿	+	-	┼	-	-	-	-	-	-		-	╁	┼
***************************************		Est.	┿┈	┼	+	 	╂	╁	┼	-	╫	┼	┿	╂	╂	-	-	┿
6	Perform two truck load tests during the course of 2 years	Act.	┼	-	┼-	+	╫	+	 	-	 	+	-	├	 	 	 	╁┈
7	Develop an intrum report	Est.	†	T	1	T	T	T	†		†	†	1	<u> </u>	T		<u> </u>	<u> </u>
,	Бетокр ал шиот терыт	Act.	Ī															
8	Develop a final report intended for publication	Est																
		Act.		<u></u>			_				L							
9		Est.								<u> </u>	<u></u>			<u> </u>	ļ			
***************************************		Act.	_	_			<u></u>	ļ			<u></u>				<u></u>	ļ	ļ	
10		Est.	1			ļ	<u> </u>		ļ	<u> </u>	<u> </u>	ļ	<u> </u>	ļ	<u> </u>	<u> </u>		1
		Act.					9						1					

POOLED FUND LEAD STATE STUDIES



GENERAL										
Title Pavement Marking Life Cycle, Ph. 2										
Fund. Source	SPR	Project Type	Traffic & Safety, Maintenance							
Charge ID	4001808H	Performing Org.	BC Traffic							
PIC	PL02.094	Contract No.	03-9184							
Project Mgr.	Berg	Contract Start Date	9/1/2002							
Princ. Inv.	Beck	Contract End Date	6/30/2006							
		FISCAL								
Contract Amt.	\$319,944	Contract Cost to Complete	\$265,246							
Contract Cost to Date	\$54,698	Project Cost to Complete	\$344,820							
OBJECTIVE										

Develop life cycle curves for methylmethacrylate, thermoplastic, tape, and epoxy pavement markings based on AADT, pavement type and winter maintenance.

IMPLEMENTATION PLAN

Curves will be used to predict location specific performance of selected pavement markings that will contribute to BMP for pavement marking programs.

STATUS

First three years of data has been collected and evaluated. Data collection continues this year. Because of personnel changes with Texas Transportation Institute, data evaluation and presentation is behind schedule. The contractor is working with them to get back on schedule.

YANY PROCESSES YANGE																		
	TASK PROGRESS TABLE		_															
NO.	TASK		2002 Q1 Q2 Q3 Q4			Q4	2003 Q1 Q2 Q3 Q4				2004 Q4 Q1 Q2 Q3 Q4				2005 Q1 Q2 Q3			Q4
		Est.	ų,	Ų2	ų3	U4	ųı	ų2	цз	Q4	ųı	U2	цз	Q4	ű	U2	ų3	U4
1	Collect 2002 Data	Act.																
2	Evaluate and present 2002 Data	Est.																
-		Act.														ш		
3	Collect 2003 Data	Est.																
		Act.														\square		
4	Evaluate and present 2001 Data	Est.																
		Act.														\square		
5	Collect 2004 Data	Est.																
		Act.														ш		
6	Evaluate and present 2004 Data	Est.																
	·	Act.														\vdash		
7	Collect 2005 Data	Est.																
		Act.														ш		
8	Evaluate and present 2005 Data	Est.																
	Crandate and present 2009 Data	Act.														ш		
9	Final report and recommendations	Est.																
		Act.														ш		
10		Est.																
1.0		Act.	1													.		i

GENERAL											
Fitle WASHTO-X											
Fund. Source	SPR	Project Type	Technology Transfer								
Charge ID	4002108H	Performing Org.	USU								
PIC		Contract No.	'02-4302 TPF-5(017)								
Project Mgr.	Doug Anderson	Contract Start Date									
Princ. Inv.	Bolling	Contract End Date									
		FISCAL									
Contract Amt.		Contract Cost to Complete	\$0								
Contract Costs to Date	\$0	Project Cost to Complete \$0									

OBJECTIVE

Conduct technology transfer sessions on technical and administrative transportation issues. Fourteen of the WASHTO States have agreed to participate and contributed funding through a pooled-fund project.

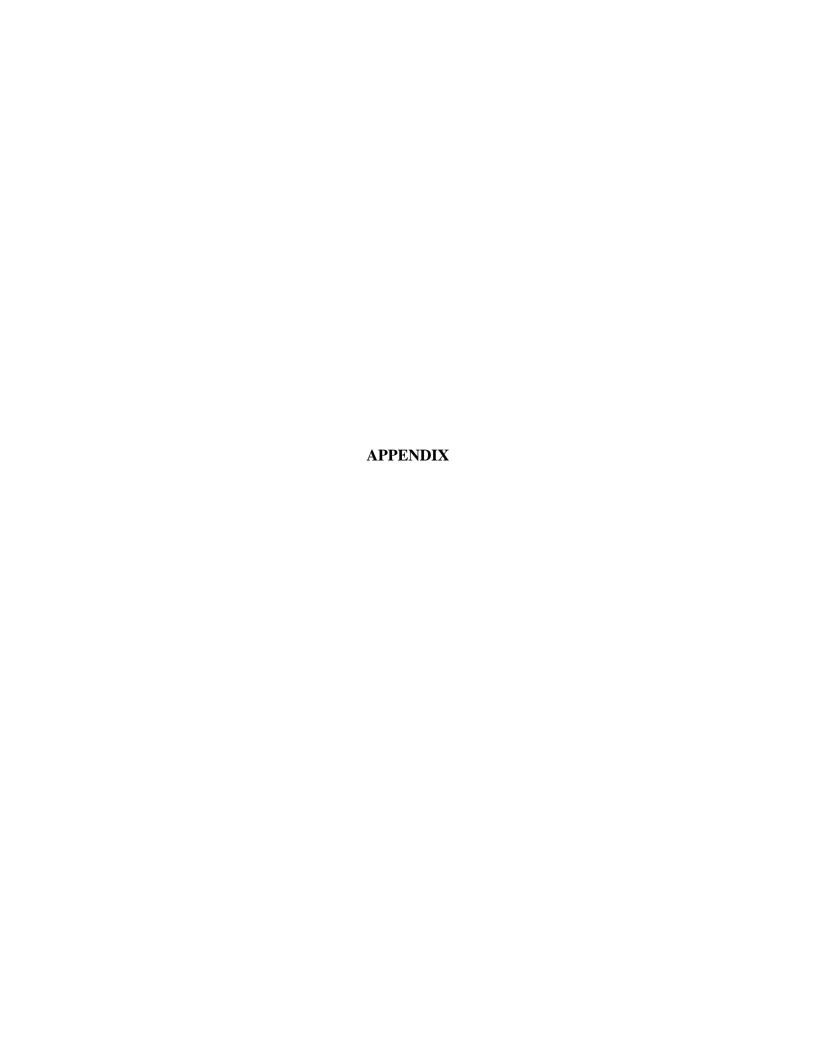
IMPLEMENTATION PLAN

1- Conduct sessions on pressing issues that are proposed by the state agencies. 2- Measure the benefits through feedback surveys. 3- The program has been proposed for continuance for another two years. The program can be maintained at a lower cost than it took to create it and role it out. 4- Present the lessons learned from the program to other regions in the country.

STATUS

Underway. A final report has been written and distrituted describing the program benefits. It has been determined that 34% of the participants have changed the way they do business as a result of attending the session. More than 90% will attend another session. A second two-year program of sessions has been planned.

TASK PROGRESS TABLE																		
NO.	TASK			20	03 Q3			20	04			20	2005		20		06	
NO.	TACK		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Present findings from the first two years.	Est.																
		Act.																
2	Begin the second series of sessions	Est.																
		Act.																
3		Est.																
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4		Est.																
·		Act.																
5		Est.																
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10		Est.																
		Act.																







Of Transportation
Federal Highway
Administration

Utah Division 2520 West 4700 South, Ste. 9A Salt Lake City, UT 84118-1847

June 30, 2005

File: 6020

Rukhsana Lindsey, Engineer For Research and Development Utah Department of Transportation 4501 South 2700 West Salt Lake City, UT 84119

SUBJECT: UDOT SFY 2006 Annual Research Division SPR Work Program

Dear Ms. Lindsey:

We have received and reviewed the SFY 2006 Research Work Program. Work may commence on the SPR-funded projects contained in the program. Other projects listed in the program are valuable for informational purposes. We greatly appreciate the consolidated approach the Research Division is now taking with regards to the work program. Please note the following important dates:

Key Dates	Actions
June 30, 2005	 SFY 2006 Research Work Program is Approved Work henceforth on SPR projects contained in the SFY 2005 Work Program is eligible for SPR reimbursement until the approval expires. All previous work programs expire. Work continuing after August 13 in previous work programs is ineligible for reimbursement. Invoices for work completed prior to August 13 are still acceptable.
January 1, 2006	 FFY 2005 work program must be closed. No charges honored thereafter.
June 1, 2006	 Draft SFY 2007 Work Program should be delivered to FHWA Utah Division for review.

Any projects not contained in the SFY06 Work Program intended to begin this state fiscal year may be added to the program by amendment. Amendments may be submitted by email to the FHWA Research Program Manager for electronic approval. Amendments need to contain new "Research Project Status Sheets" and a corresponding update to the budget worksheets in the beginning of the work program.

This approval is in anticipation of future Federal funds. The Federal Government assumes no obligation to reimburse for research work beyond available funding levels.



Should you have any questions, please do not hesitate to contact me. I can be reached at 963-0078 ext. 236.

Sincerely,

Paul Mooney

Technology and Marketing Specialist

CC:

Jim McMinimee, UDOT, Project Development, Box 8380 Michelle Page, UDOT, Research, Box 8410 Frank Long, FHWA Kelly Garner, UDOT, Comptroller, Box 3600 Steve Call, FHWA

PMOONEY:dm

